

# MARINE REVIEW.

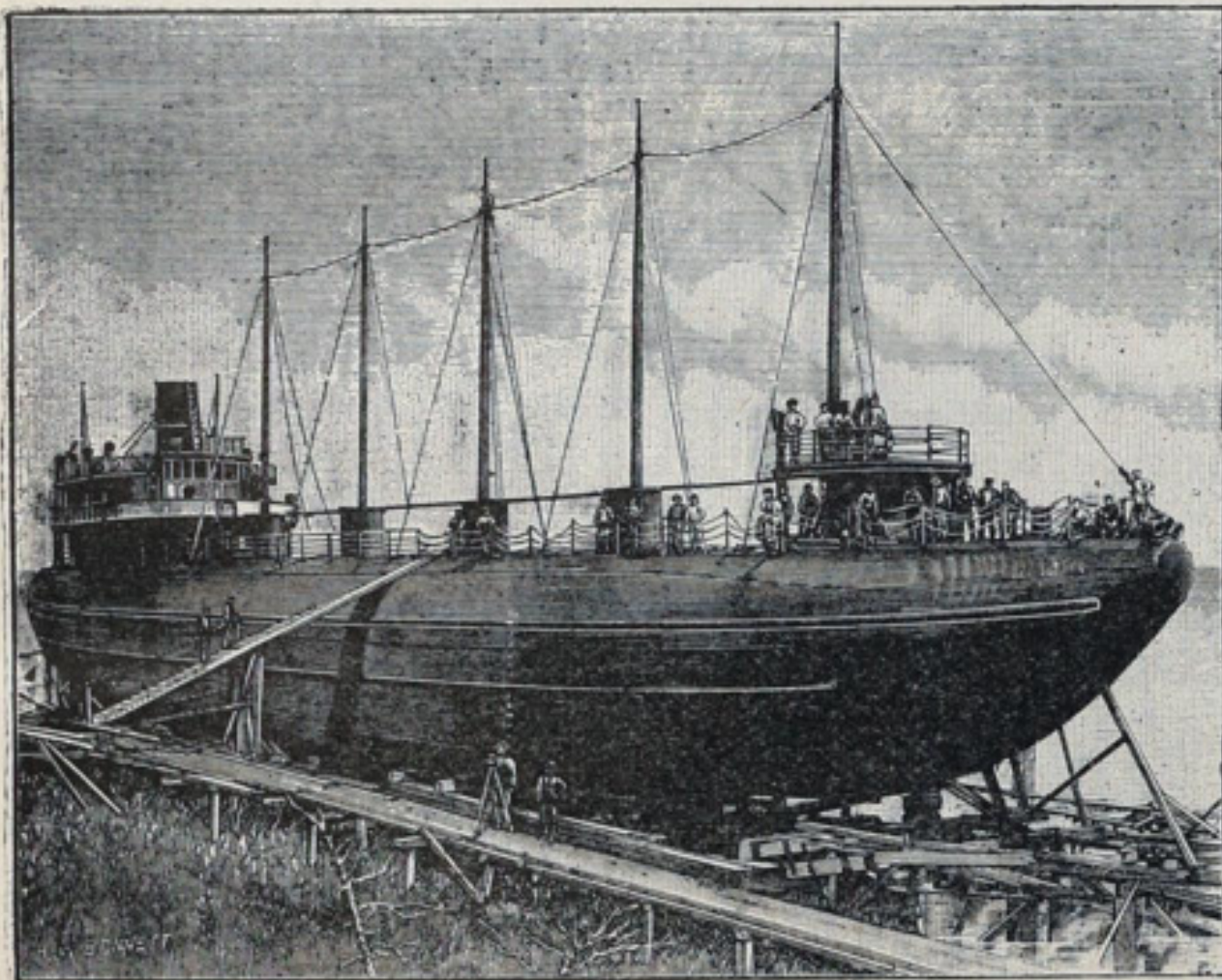
VOL. VII.

CLEVELAND, OHIO, THURSDAY, JANUARY 19, 1893.

No. 3.

## The Pacific Coast Whaleback.

The whaleback passenger and freight steamer being constructed at Everett, Wash., the Puget sound town recently built up by eastern capitalists who are interested in the American Steel Barge Company, is well along toward completion. The accompanying illustration, made from a photograph, will give an idea of the appearance of the boat.



WHALEBACK BUILDING ON THE PACIFIC COAST.

The Frontier Iron Works Company, Detroit, Mich., will build triple expansion surface condensing engines for this steamer. The engines will be 24, 38 and 64 inches by 42 inches stroke, and the most complete salt water machinery turned out of any lake shop. Many improvements in this style of engine will be used for the first time. This makes the third large triple engine built by this company for ocean steamers. The others were for the Mackinaw and Keweenaw.

## The Big Chapin Pumping Plant.

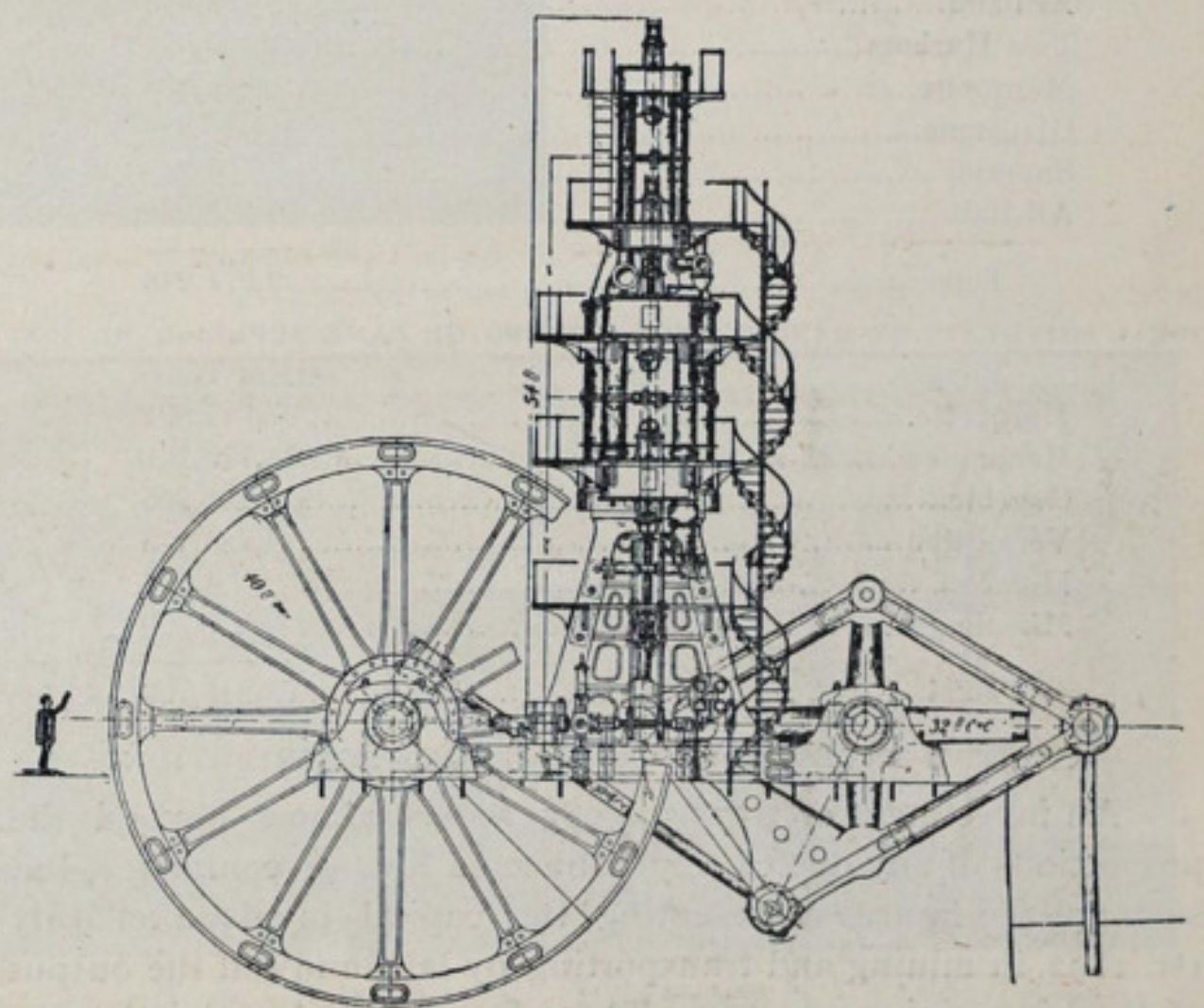
The engraving given herewith is from a drawing of an engine which is notable not only for its large size, but also for the special adaptation of its design to the work which it is intended to do. It was recently built by the Edward P. Allis Company of Milwaukee, for the Chapin Mining Company of Iron Mountain, Mich. It is a compound engine of the steeple pattern and is designed to raise water up a vertical shaft from a depth of 1,500 feet. The work will be done by plunger pumps placed in the shaft about 200 feet apart. These pumps have plungers 28 inches in diameter and 10 feet stroke. The plungers are connected and driven by a steel rod 7 inches in diameter extending to the bottom of the shaft and working in guides placed about 20 feet apart. At its upper end this driving-rod is connected to the beam shown in the engraving, from which it receives a reciprocating motion, and which is, in turn, driven directly by the engine.

The high pressure cylinder of the engine is 50 inches in diameter and 10 feet stroke, and the low pressure cylinder 100 inches in diameter and 10 feet stroke. The ratio of the cylinders is 1:4. The engine is designed to work with 125 pounds pressure. Steam is supplied by vertical tubular boilers of the Reynolds type. The cylinders have poppet valve-gear with a

trip cut-off on the high pressure cylinder and a Stevens cut-off on the low pressure cylinder. There is an independent steam-power air pump and a surface condenser, and in the latter, part of the water raised from the mine will be used for condensing purposes.

A peculiar feature of this engine is that the cylinders and valve-gear are so proportioned and arranged that the engine can be run by compressed air instead of steam, if desired. In running with air, the large or low pressure cylinder would be used as the initial cylinder. The Chapin Company has a plant of large capacity at Quinnesec Falls, where air is compressed by water-power, and from this plant the engine can be supplied, should it be decided to dispense with steam.

The great size and capacity of the engine will be better understood from some of the details. The journals of the main shaft and of the beam centers are 24 inches in diameter and 36 inches long. The crank-pin, crosshead-pin and the pins on the beam have bearings 16 inches in diameter and 18 inches long. The connecting rod is 30 feet in length and is 15 inches in diameter at the center. The fly wheel is 40 feet in diameter and



BIG CHAPIN MINE ENGINE.

weighs 160 tons. The main beam is 32 feet between centers, and its weight complete is 100 tons. The total weight of the engine, including only the parts shown in the engraving, and excluding the pumps and other work in the shaft, is 600 tons. Its total height above the engine room floor is 54 feet. It is one of the largest stationary engines in the country. The illustration is from the American Engineer and Railroad Journal, New York.

## A Most Important Measure.

The action of the House of Representatives on Thursday in passing the Brickner omnibus light-house bill will give to the lakes more aids to navigation than have ever before been received in a single measure. This bill only authorizes the lights, fog signals, etc., but it is a great victory to have it passed. There will now be less trouble in securing appropriations. The senate will undoubtedly pass the bill without hesitancy, and something in the way of appropriations may be secured from the present congress. The measure just passed authorizes an expenditure of about \$450,000 on the lakes.



## LAKE SUPERIOR IRON ORE PRODUCTION.

## Statistics for the Calendar Year 1892—Magnitude of Capital in Mining and Distribution.

With this issue the REVIEW presents a supplemental statement of iron ore shipments from all Lake Superior mines for 1892 and for the past thirty-seven years, and in connection with these statistics a collection of illustrations that will tend to show the dock machinery and the best methods that have rendered possible the work of handling in a single season of navigation more than 9,000,000 gross tons of ore in addition to the large quantities of coal, grain, lumber and other freight.

Turning first to the ore statistics for 1892 it is found that the shipments, lake and rail, for the full year again surpass all previous records, the aggregate from all mines being 9,074,243 gross tons, divided among the different ranges and ports as follows:

## SHIPMENTS BY RANGE, LAKE AND RAIL, 1892.

Ranges.	Gross Tons.
Gogebic.....	2,973,993
Marquette.....	2,666,856
Menominee.....	2,261,499
Vermilion.....	1,167,650
Mesaba.....	4,245
Total.....	9,074,243

## SHIPMENTS BY PORTS AND ALL-RAIL, 1892.

Ports.	Gross Tons.
Escanaba.....	4,010,085
Ashland.....	2,223,683
Two Harbors.....	1,165,076
Marquette.....	1,026,338
Gladstone.....	115,886
Superior.....	4,245
All-Rail.....	528,930
Total.....	9,074,243

## TOTAL SHIPMENTS BY RANGES SINCE OPENING OF LAKE SUPERIOR REGION.

Ranges.	Gross Tons.
Marquette.....	37,917,591
Menominee.....	16,779,261
Gogebic.....	13,260,206
Vermillion.....	5,285,173
Mesaba.....	4,245
Miscellaneous.....	2,320
Total.....	73,248,796

## CAPITAL INVESTED IN MINING AND DISTRIBUTION.

An investment of \$175,394,985 seems almost beyond the proportions of any one closely connected line of commerce, but such are the figures representing the capital involved on July 1st, 1892, in mining and transporting by lake and rail the output of the lake mining country. These figures as to capital were presented recently by Mr. George H. Ely of Cleveland after months of inquiry and research among the numerous companies involved in the business. They can be comprehended only by considering that 73,248,796 gross tons is the output of the mines since 1855 when this immense industry was begun. Iron ore forms the largest single item in the lake trade, and the discovery of new properties in Minnesota during the year just closed would seem to indicate another era of enormous increases in shipments when these properties are fully developed in 1894.

This country consumed in 1890, 17,500,000 gross tons of iron ore. Of this amount, 1,246,830 tons were imported and 16,253,170 tons were of home production. Lake Superior mines produced in the same year 9,003,701 gross tons, or more than one-half the raw material for a nation that leads the world in the output of pig iron, Bessemer steel and steel rails. The average value of iron ore mined in the United States in 1889 on cars and carts at the mines is given by the census bureau at \$2.30 per ton. The value of such ore at Lake Superior mines averaged \$2.66 per ton, while the ores of Alabama, Tennessee, Virginia and West Virginia averaged only \$1.20 per ton in value at the mines.

The figures referred to above, as prepared by Mr. Ely, make up a most forcible statement in evidence of the magnitude of this industry. They will bear reprinting:

Capital in mines in the four Lake Superior districts in 1889, as per United States Census.....	\$54,825,122
Increase to July 1, 1892.....	15,000,000
Capital in docks and their equipments at Lake Superior and Lake Michigan ports, built and used exclusively for shipping ore (official).....	9,885,665
Capital employed exclusively in railroad transportation of ore from mines to shipping ports on Lake Superior and Lake Michigan (official).....	27,014,594
Floating capital on the lakes, employed exclusively in ore transportation, from upper lakes to lower lake ports (estimated).....	29,933,107
Capital in docks, and in their equipments, for receiving and forwarding ore exclusively, at Lake Erie ports between Toledo and Buffalo, inclusive of both (official).....	12,392,880
Capital employed exclusively in railroad transportation of ore, inland to mills and furnaces from Lake Erie ports (official).....	26,343,617
Total.....	\$175,394,985

The engravings on the opposite page are from photographs. They were selected from numerous views of the various docks at upper and lower lake ports.

## Ore Sales Market—Question of Freights.

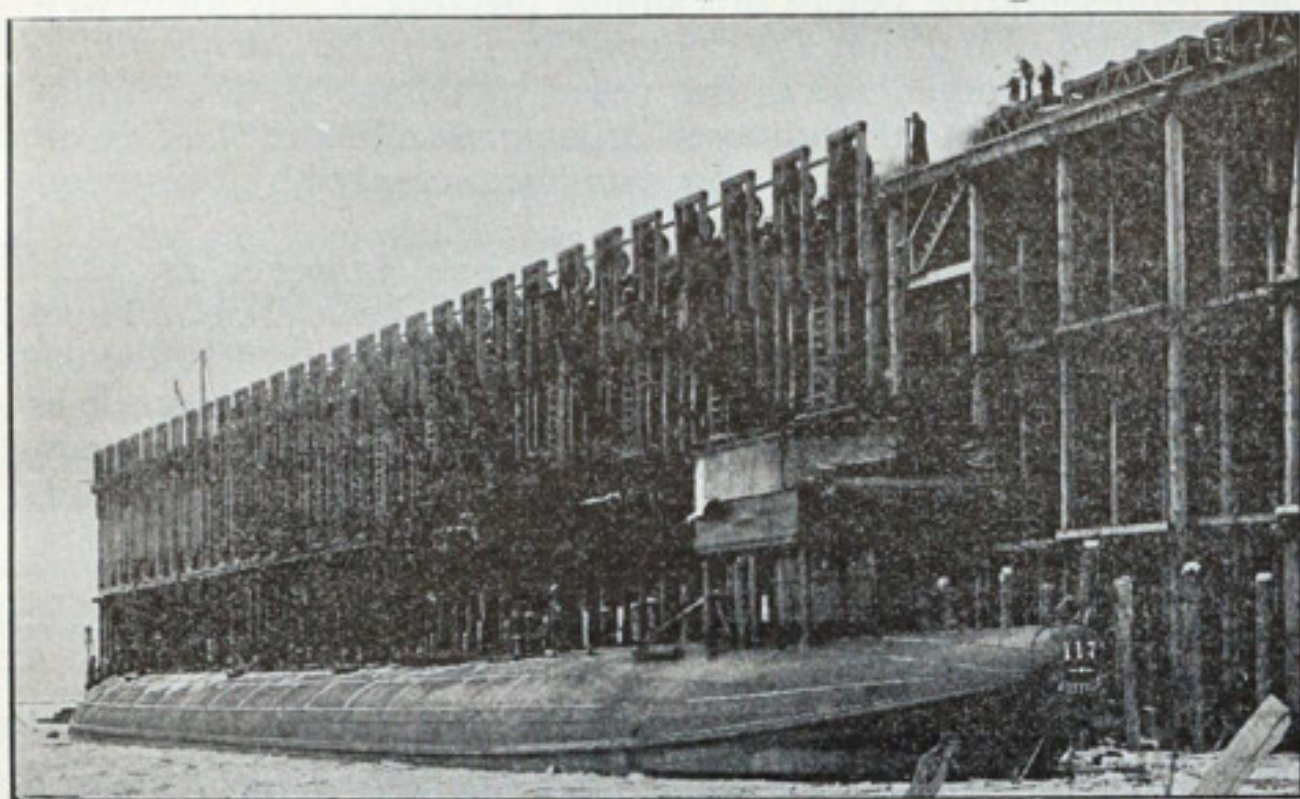
Two rumors regarding sales of ore for next season's delivery have been current during the past few days. One of them credited the Florence-Iron River Company, producing non-Bessemer ore, with having sold 300,000 tons, and the other was to the effect that the Illinois Steel Company had made a large purchase of Bessemer ore. Mr. J. C. Morse, of the Illinois Steel Company, is a member of the firm of Pickands, Mather & Co., Cleveland, and it is not at all probable that the big Chicago company would purchase any ore without asking the Cleveland company for prices. At the office of Pickands, Mather & Co. the rumor of sales is emphatically denied, without any qualifications. The Florence-Iron River Company is represented in Cleveland by Tod, Stambaugh & Co., and here too the talk of sales is declared to be without foundation. It is not expected that there will be any great margin of profit in the ore business, but sales agents look for a demand that will care for a heavy product in 1893, and are still satisfied that the Mesaba output for the first year can not be large enough to influence prices. Enormous stocks of grain in all parts of the country will cause vessel owners to hold out for fair rates of lake freights, as a heavy business in the spring is insured beyond any doubt.

## Meeting of the Republic Company.

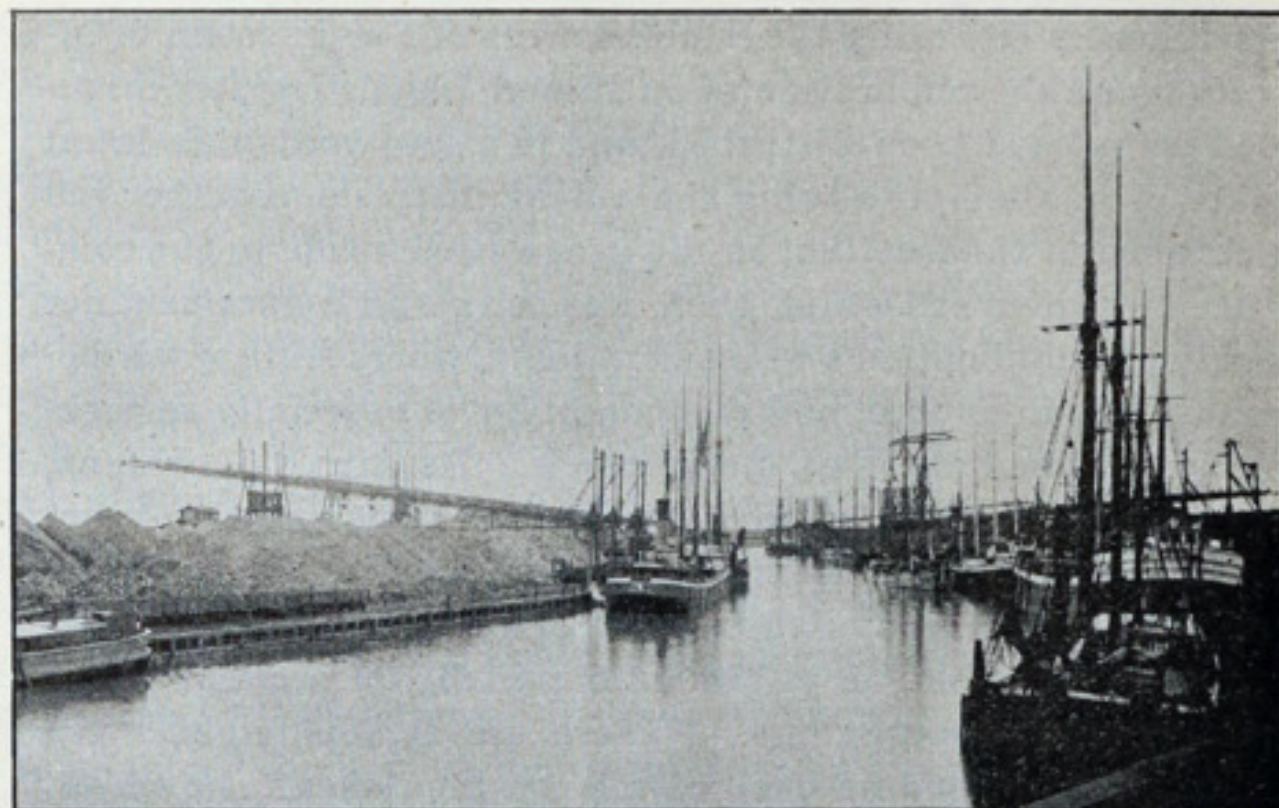
At the annual meeting of the Republic Iron Company on Wednesday, called for the purpose of electing a board of directors and voting on the question of amending the articles of association, so as to allow the company to acquire property outside of the state of Michigan, the Chicago stockholders, who opposed the proposed amendment at a special meeting last month, represented about 28,000 shares of the stock. An amicable understanding was arrived at, by which three members of the Chicago party were elected to the board of directors as representatives of the stock which they held, and a proposition giving the power sought at the special meeting to the board of directors was passed unanimously. This leaves the matter of taking up new mining property presumably on the Mesaba range to the directors. The new board of directors is made up of H. B. Perkins of Warren, O., G. W. R. Matteson of Providence, R. I., Peter White, of Marquette, Mich., Samuel Mather, W. D. Rees, and J. V. Painter of Cleveland, Abraham Hart and C. F. Dummer of Chicago, and M. M. Kaufman of Marquette, Mich. The three last named gentlemen were among the representatives of the so-called Chicago party. Officers re-elected are the same as last year. They are: W. D. Rees, president and treasurer; H. B. Perkins, vice president; W. B. Castle, secretary; Douglass Perkins, auditor.



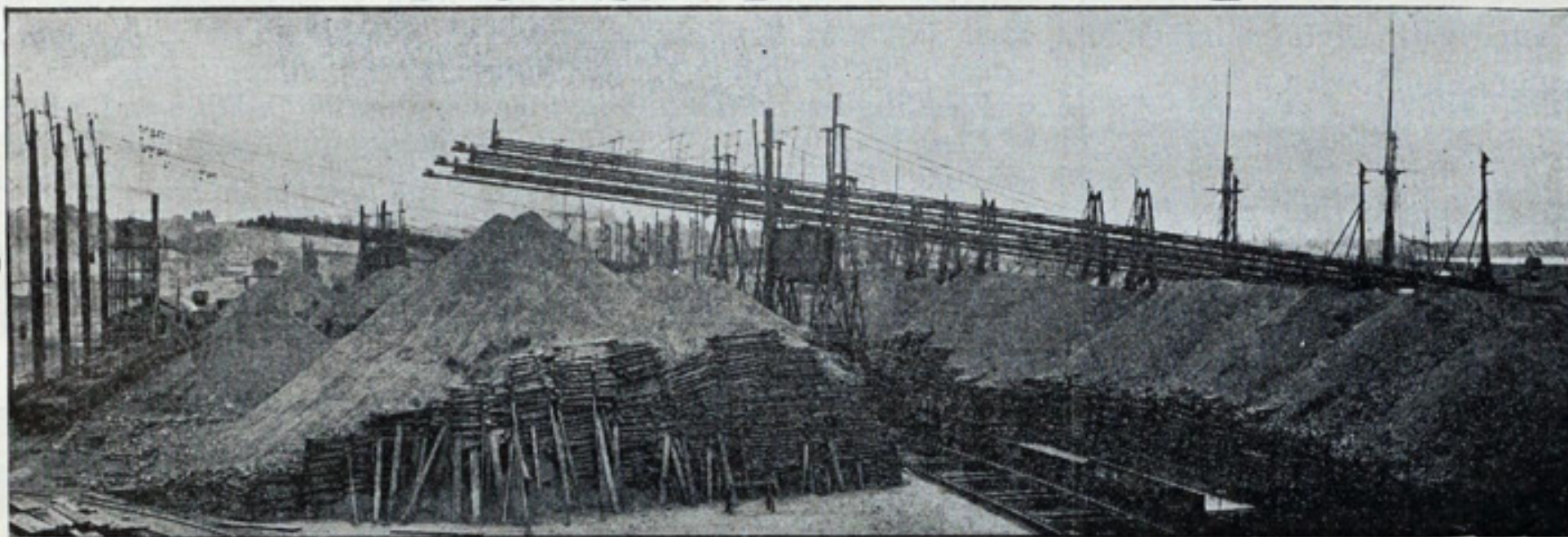
Upper and Lower Lake Dock Plants.



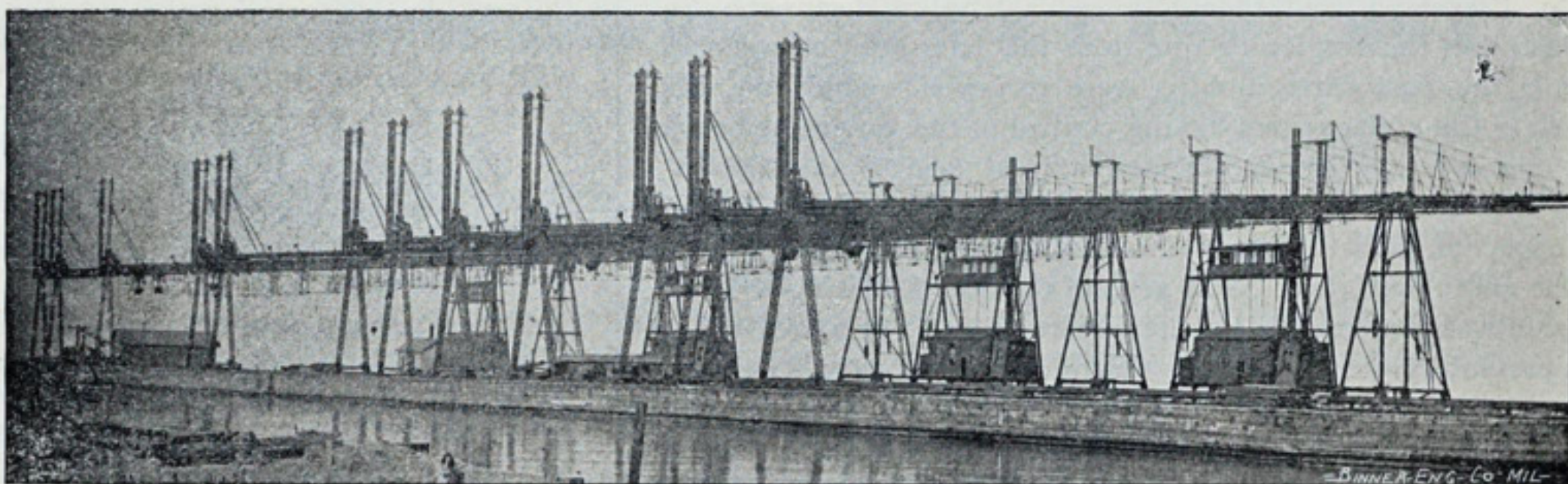
SECOND CARGO OF MESABA ORE LOADING AT SUPERIOR, WIS.



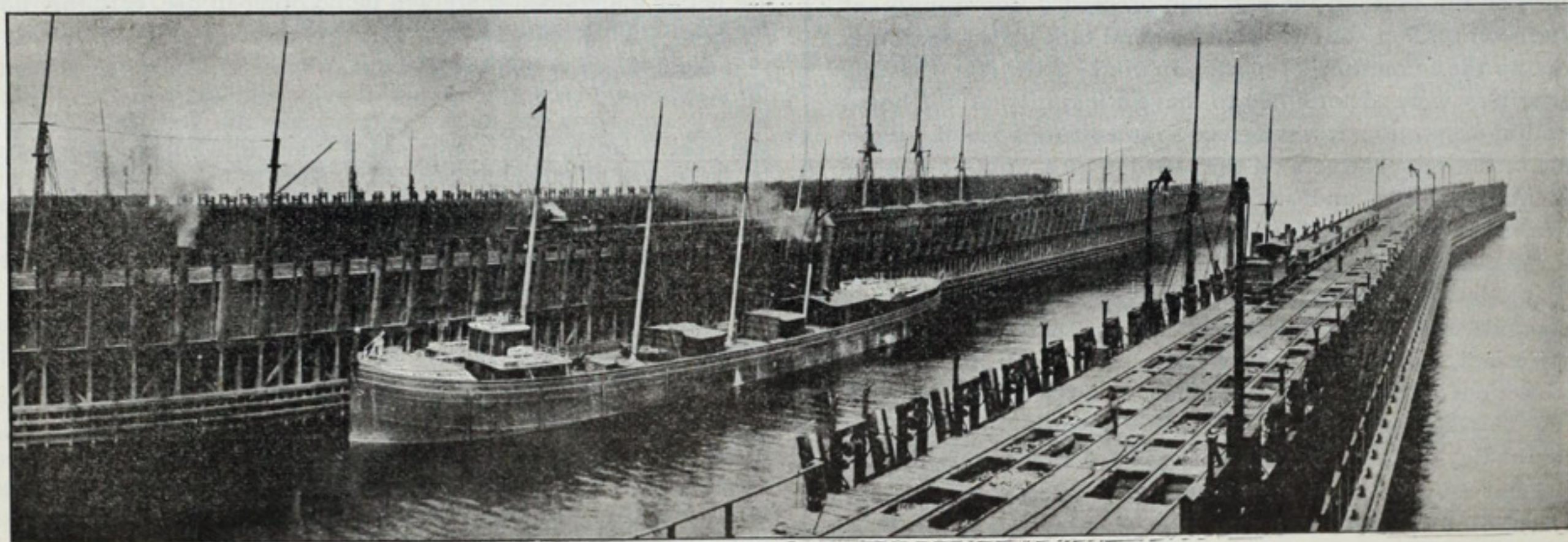
N. Y. P. & O. AND C. & P. DOCKS FOR UNLOADING ORE AT CLEVELAND.



REAR VIEW OF CLEVELAND DOCKS.



NEW MENOMINEE DOCK, ASHTABULA HARBOR.—ONE OF THE LARGEST ORE UNLOADING DOCKS ON THE LAKES.



ORE DOCKS AND POCKETS, ESCANABA, MICH.—THE GREATEST ORE SHIPPING PORT IN THE WORLD.



### Still Working on Questions of Insurance.

Again the hopes of Lake underwriters for an agreement with vessel owners regarding the establishment of a new system of inspection and the publication of an Inland Lloyds register on revised plans have been disturbed, and in a few words this latest failure in an attempt to bring the varied interests together can be ascribed to the fact that in the proposition made to the committee of owners at Detroit, there was neither an inducement nor an obligation submitted for consideration. Owners still show a disposition of indifference, and this condition is especially remarkable among the owners of steel vessels. As Mr. L. C. Hanna, president of the Mutual and Menominee transportation companies remarked in connection with the discussion at the Cleveland meeting Thursday, the owners of steel vessels are not borrowing any trouble, as might be expected, on account of the anxiety among underwriters. "There are at least eight or ten millions represented in steel vessels on the lakes," he added. "Steel is the material of the future, and no matter what the underwriters may do it seems highly probable that within twelve months this class of owners will insure their own property. Three officers would do all work connected with such insurance for the present steel fleet. An inspector, a man with a knowledge of insurance business and a clerk would be all that would be required."

The meeting which was held in the rooms of the Excelsior Marine Benevolent Association Thursday, was attended by only five representatives of shipping firms out-side of Cleveland. They were Capt. James Millen and Gilbert N. McMillan of Detroit, Edward Smith and C. H. Keep of Buffalo, and F. W. Wheeler of West Bay City. The report of the Detroit committee, which proposed in substance that vessels pay half the cost of inspection and have a representation of three members on the executive committee, as against virtually four members from the underwriters, was read by Mr. H. Coubly of Pickands, Mather & Co., Cleveland, and then followed a lengthy discussion, in which all of the perplexing questions that have been brought up during the past three months were reviewed. Objection was raised to the underwriters having control of the executive board in the proposed organization, and a great deal of talk was indulged in about the estimate of the underwriters as to the cost of inspection, and the question of giving them the deciding vote in the executive board. The general opinion following the discussion was that the underwriters were asking a great deal without presenting even a good argument as to inducements for having vessels pay a cent or a cent and a half per ton for inspection.

The gathering, although only meagerly representative of the entire shipping interests of the lakes, was disposed, however, to look upon the action of the general meeting of vessel owners in Detroit as favorable to the underwriters who have been doing business on the lakes in the past and proceeded accordingly, at an afternoon session following the general talk in the morning, to take up the committee's report. In view of the fact that the underwriters were determined to have a majority of the board controlling inspection, it was agreed to substitute a metal builder for one of the vessel owners on the board, which would make the representation three underwriters, two vessel owners and one builder, with the underwriters further fortified by the president of the association having a vote. M. A. Bradley of Cleveland and Capt. James Millen of Detroit were selected as members of the committee for the vessel owners, and the metal ship builders will be asked, through Messrs. Wheeler and McMillan, to meet and select one of their number for the committee. The builders will not be asked to bear any part of the expense. The name of C. H. Bradley of Bay City will be suggested as vice president of the organization, which office, however, is simply an honorary one, the vice president having no vote. On motion of Mr. B. L. Pennington of Cleveland it was agreed that the executive committee shall have full authority to carry into effect the whole

system of inspection and classification as well as appeals and any other detail. It is expected that the ship builders will select their representative before the annual meeting of the underwriters in Detroit, and that the underwriters will be consulted regarding the proceedings of the vessel owners so as to complete details pertaining to the proposed organization before the Detroit meeting, if matters as they now stand are accepted by the underwriters.

The whole question is still an open one, however, as vessel owners are not bound by anything that has been done. There is simply a feeling that everybody who has taken part in the deliberations will, as a matter of principle, consider themselves bound by any mutual agreement that may be reached. It is certain that many vessel owners, especially those whose boats have already been classed by the standard classification associations, will not pay for the proposed inspection.

### Sales of Vessel Property.

The following sales of vessel property have been reported within the past few days: Schooner No. 56, building at the yard of Capt. James Davidson, West Bay City, to W. C. Richardson and associates of Cleveland, \$52,000; schooner Our Son, Henry Kelley of Milan, to Gurdon Corning of East Saginaw, \$20,000; schooner Genoa, to Capt. John T. Edgar and others of East Saginaw, \$15,000; schooner C. G. King, Capt. Jeremiah Green of Cleveland to John T. Edgar, Gurdon Corning and others of East Saginaw, \$5,000; schooner Camden, W. B. Hale and others of Cleveland to John F. Wedow and others of Cleveland, \$16,000; schooner Joseph Paige, John W. Warner and others of Cleveland to John F. Wedow and others of Cleveland, \$15,000; steambarge Preston, P. F. Thrall of Green Bay to J. M. Jones, Jr., and others of Toledo; steambarge S. C. Clarke, Detroit parties, to J. W. Squires of Marine City, \$11,000; schooner Richard Winslow, J. L. Crosthwaite of Buffalo to Capt. Peter Wex, \$20,000.

The schooner purchased from Capt. Davidson by Capt. W. C. Richardson and associates will be a consort for the J. H. Outhwaite, and is to be completed on the opening of navigation. She is now in frame and partly ceiled. Her dimensions are 222 feet keel, 19 feet hold and 36 feet beam. She is arched and strapped, will rate A1\* and will carry 2,200 tons on 15 feet draft. The Our Son and Genoa, which were sold through H. J. Webb & Co., will be consorts for the steamer C. H. Green, commanded by Capt. J. C. Garey of East Saginaw. The Richard Winslow will tow with the Inter Ocean, controlled by Capt. Wex.

### Trade Notes.

The American schooner John A. Matheson, American ship St. David and British schooner Minnie were classified and registered last week by the American Shipmasters' Association, New York.

Capstans are coming into use for various purposes. The American Ship Windlass Company recently received an order from the Pennsylvania company for two or their machines to be used for switching cars in and out of paint shops.

The Roberts water-tube boiler has had a notable success, and the inventor of it, E. E. Roberts, has undoubtedly a larger number of them afloat than any other maker. The boilers have so few disabilities and so many valuable features, that when they are better understood there will be no other in use, certainly not for marine purposes.—Engineer.

An apology is due the Penberthy Injector Company, Detroit, for stating in a recent issue that they would send their calendar to any one asking for it and mentioning the REVIEW. Their statement to us that they only issued enough to supply their regular trade was misunderstood. They state to us now that they do not like to refuse requests, but the large number of them mentioning the REVIEW has made it almost necessary. Any one failing to receive a calendar will please blame the REVIEW and not the Penberthy company.

Thos. Drein & Son, Wilmington, Del., have received the following orders recently: Twenty 20-foot beaded bottom metallic life-boats for the world's fair whaleback passenger steamer; twelve 22-foot boats of the same kind for the Lake Michigan and Lake Superior Transit Co., Chicago; two 20-foot metallic life boats, four large sized rafts and fit-out of cork life preservers and rings for the Williams Transportation Company, and a duplicate order for the Holland passenger steamer. In addition orders have been placed for outfits of steamers building at Wheeler's yard, West Bay City, Mich. These are all for lake steamers, and the company has an equally good lot of orders from coast yards.



### Repairs to the Umbria's Shaft.

The three illustrations on this page, reproduced from Scientific American, show more clearly than the short article in the REVIEW last week the crack in the shaft of the Umbria, and how temporary and final repairs were made. On Dec. 23, while running about 20 miles an hour off the Newfoundland coast, Chief Engineer Tomlinson discovered a fracture in the shaft between two collars, shown in figure 1. There were two distinct cracks, the most serious running diagonally from flange to flange on one side of the shaft. A chain was placed around the shaft and secured above to steel beams, which were shored so that they would stand the strain. Three holes were drilled through the collars of the shaft on each side of the break for large bolts. Shifts of five men worked night and day with hand drills, and 180 inches of iron was drilled through. A clamp or strap was bolted around the shaft between the collar before the bolts were put in place. After the bolts were screwed up another strap was put around them, its flanges being turned inward. (See figure 2). Following is the chief engineer's description of the mode of operations:

"We had on board some heavy, tough steel bolts 6 inches in diameter, and long enough to take in the rings or collars on each side of the flaw, so I decided to cut out gaps in these rings and drop in these steel bolts and hold the shaft together, and as well transmit the power of the engine through them to the wheel at the other end of the shaft. It was a slow and tedious job to cut these gaps six inches deep, through hard steel collars  $3\frac{1}{2}$  inches thick. But at the end of twenty-four hours we had one

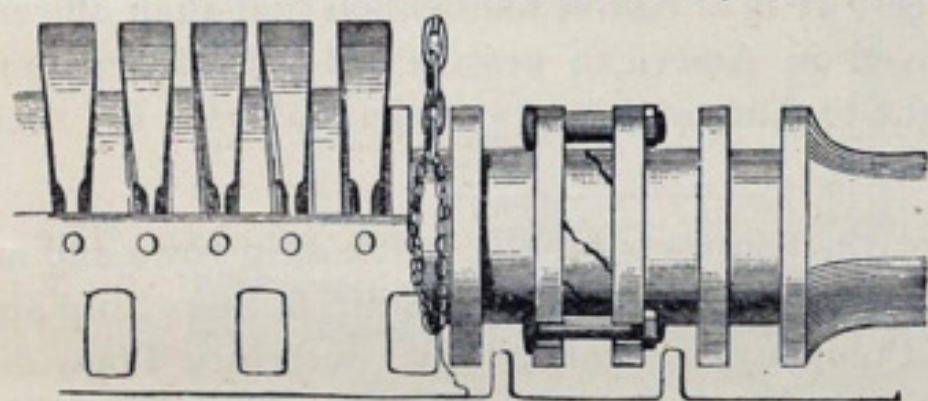


FIGURE 1.

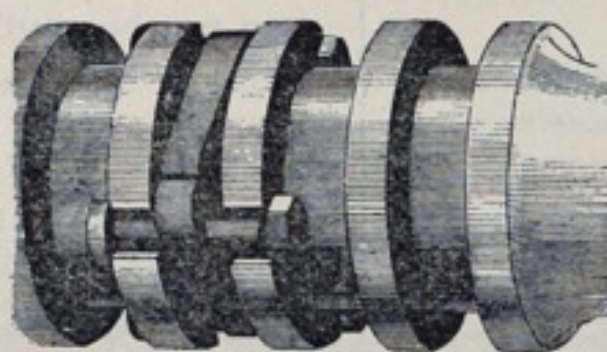


FIGURE 2.

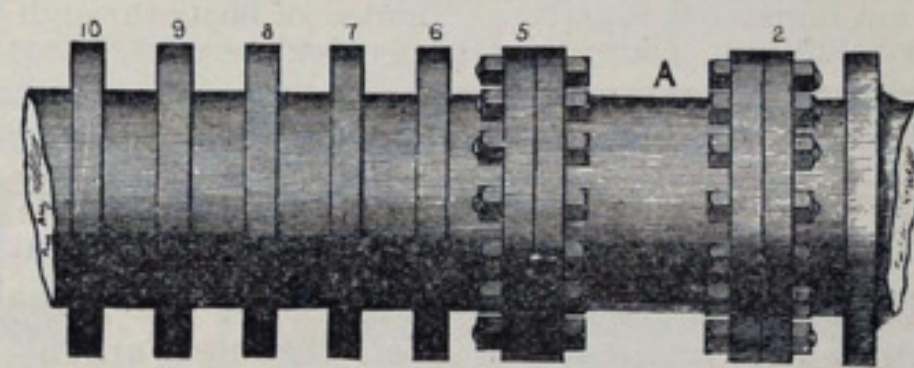


FIGURE 3.

bolt in. I had planned to put in five bolts equally spaced around the shaft, but as I found it would add two more days to the delay, I reduced the number to three. In addition to the labor incurred in preparing the shaft, I found that there was a heavy rib in the thrust bearing, that would not allow the nuts on the bolts, which were  $4\frac{1}{2}$  inches deep, to go around with the shaft, so we had to split or cut the nuts in two pieces, so as to make them only  $2\frac{1}{2}$  inches thick, and also cut off the end of the heavy bolts. At the end of seventy-two hours of unremitting labor by all hands, we were ready to turn on steam and give the shaft a trial. As the crack in the shaft was an oblique one, thus pushing one part ahead of the other, I concluded that I ought to screw up the 6-inch bolts as hard as I could; but there is where I made a mistake, for on starting the engine and gradually increasing its speed to thirty revolutions per minute, the head of one of the bolts flew off. I had to shut down again. When the new bolt was put in, it was not screwed up so very hard, and the others were slacked off a bit, and we started again and gradually got the speed up to 10 knots an hour."

The plan of final repair is shown in figure 3. The fractured part of the shaft will be cut out even with the faces of two of the thrust collars, and a section of steel corresponding to the part removed will be put in. The collars of the inserted piece will be bolted to the collars of the shaft.

### Furnace Trials of Mesaba Ore.

Since two cargoes of 4,245 tons of Mesaba ore from the mine of the Mountain Iron Company were received here during the closing days of navigation and shipped direct to four or five furnaces for tests, considerable interest has been manifested in

learning the results of the trials. No official statements have been given out, but from what has been learned in various ways ore dealers in Cleveland are all of the opinion that the yield from the new ore is very satisfactory, as most iron men had expected it would be. Comment from sales agents outside of the representatives of the new ore is inclined however, to criticize the method of obtaining trials from the two cargoes brought down, and in this respect the statement of one agent will serve to indicate the general opinion. "It is argued," he said, "that the interests of those connected with the production of Mesaba ore generally would have been better subserved if the entire 4,000 tons had been given to one furnace concern. In distributing the two cargoes between several concerns, there was not in any case more than 20 or 26 per cent. of the ore used in the furnace mixture, and as a result it is not known just what percentage can be used with safety or to advantage. If this ore is to be produced in very large quantities, as is expected, it would be well to know that 50 per cent. of it can be used, and this point as well as the whole question of percentage would have been determined in a more satisfactory way if the ore had not been distributed as it was."

### Crowded Grain Elevators—Largest Stocks Ever Known.

Grain stocks both in farmer's hands and available in elevators are the largest ever known in this country. A glance at the summary of stocks in the elevators, printed below, is sufficient to show the crowded condition of the storage houses. Supplies in elevators at Chicago, Duluth and other lake points show an increase each week, but rates offered for storage in lake vessels

and delivery at Buffalo in the spring do not increase. Chicago shippers are getting some vessel room at 4 cents for wheat and do not seem inclined to bid the rate up in order to secure the large portion of the tonnage still unemployed. One shipper in Milwaukee is badly in need of room but refuses to pay more than  $3\frac{1}{2}$  cents. Duluth shippers claim that tonnage is offered them at  $3\frac{1}{2}$  cents to load at opening of navigation.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principle points of accumulation on the lakes on Jan. 14, 1893:

	Wheat, bu.	Corn, bu.
Chicago.....	12,794,000	5,593,000
Duluth.....	15,446,000	217,000
Milwaukee.....	2,353,000	29,000
Detroit.....	1,744,000	21,000
Toledo.....	3,628,000	1,276,000
Buffalo.....	3,970,000	184,000
Total.....	39,935,000	7,320,000

### In General.

The Webb Home for needy shipwrights and their wives, and school for naval architecture and marine engineering, on Fordam Heights, New York, will be ready for occupancy in the spring.

The naval hydrographic office has been formally transferred from the bureau of equipment to the bureau of navigation, in the naval department, which brings it under the direction of Commodore Ramsay.

It is announced from Philadelphia that the celebrated steamship Howard Cassard, about which so much was printed some time ago, has been undergoing extensive alterations, and will again be brought into prominence shortly.



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DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department contain the names of 3,600 vessels, measuring 1,154,870.38 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of vessels of 1,000 to 2,500 tons on the lakes on June 30, 1891, was 310 and their aggregate gross tonnage 512,787.58; in all other parts of the country the number of this class of vessels was, on the same date, 213 and their gross tonnage 319,750.84. The classification of the entire lake fleet is as follows:

Class.	Number.	Tonnage.
Steam vessels .....	1,592	756,751.53
Sailing vessels.....	1,243	325,131.06
Canal boats.....	703	72,515.42
Barges.....	62	20,472.37

Total..... 3,600 1,154,870.38

Tonnage built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	No. of boats.	Net Tonnage.
1887.....	152	56,488.32
1888.....	222	101,102.87
1889.....	225	107,080.30
1890.....	218	108,515.00
1891.....	204	111,856.45

Total..... 1,021 485,042.94

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 228 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014. Number of boats through St. Mary's Falls canal in 1891, 225 days of navigation, 10,191; tonnage, net registered, 8,400,685. Number of boats through Suez canal during 1891, full year, 4,207; tonnage, net registered, 8,698,777.

Entered at Cleveland Post Office as Second-class Mail Matter.

THE waterways convention held last week at Washington, will not accomplish the end for which it was called. This is evidently the conclusion of even the most ardent supporters of the project for a canal through American territory from the lakes to the seaboard, and now that it is clearly evident that an appropriation can not be secured from the present congress for the proposed survey, it may as well be said that some bad mistakes were made in connection with the Washington gathering. Secretary Thompson and the members of the Duluth Chamber of Commerce, who called the convention, acted very hastily and without a full understanding with the active managers of lake business. In the first place it was certain, as the REVIEW has repeatedly stated, that most of the best friends of this project on the lakes were of the opinion that there was great danger of failure in a convention at this time, especially on account of the present congress, as well as the incoming administration, being pledged to retrenchment. On the other hand the Duluth advocates of the convention, who can hardly be blamed for their anxiety, understood the delay that would follow the appointment of a commission of engineers to take up a survey if an appropriation for that purpose could be secured, and they were unduly hasty in bringing about the meeting. Furthermore, the date of the meeting as fixed at Duluth, conflicted with the annual meeting of the Lake Carriers' Association, a body representative of all active lake shipping interests, and the members of the association could not go to Washington. As a result the convention was not fully representative of the lakes, and its demands upon the Democratic committee on rules for a hearing in the house met with the strongest kind of opposition on account of the effort being made by certain influential congressmen on the side of the party in power to even cut down appropriations on river and harbor work already authorized. Thus the effort to secure a survey for the canal has failed for the present. It is not a dead issue, however, as the railway managers and citizens of Buffalo, who ridicule it as a ship-canal dream, will find before many more

seasons of growing commerce on the lakes have passed. Canada is still far from being in possession of a 14-foot waterway from Lake Superior to the seaboard, and admitting that the Dominion canals were completed they would detract little from American lake commerce, as such a draft and proportionate size of locks are entirely inadequate. The great American lake ship canal is not dead. It is simply awaiting further demonstration of the great usefulness of the lakes as highways of commerce for the entire nation.

NEWSPAPERS in New York and on the Pacific coast, and even a few publications in lake cities, are claiming that a recent decision of Judge Brown of Chicago, in the case of the Seamen's Union against Capt. William H. Landgraf of the schooner Ida Keith, reverses previous rulings of the treasury department and is in conflict with the understanding of lake vessel owners and masters regarding their rights under the alien contract labor law. This is not true. On the contrary, Judge Brown's decision supports all previous rulings regarding the operation of this law on the lakes. Last June, Capt. Landgraf sailed to Port Huron with six men aboard. At that place he discharged two of his crew and then sailed across the river to Sarnia, a Canadian port. There he discharged the rest of them because the men refused to put out short handed. In their places he shipped alien sailors. Judge Brown held, and so instructed the jury, that congress did not intend, in the contract labor law, to prohibit the employment of alien sailors for service on American vessels plying the great lakes. He also overruled the contention of the prosecution that the master of the Ida Keith was not properly engaged in international commerce. It is of course understood that alien officers can not be employed on American vessels and that alien sailors can not be brought to American ports under contract for their services.

IN AWARDING the contracts for the battle ship Iowa and armored cruiser Brooklyn to the William Cramp & Sons Ship and Engine Building Company of Philadelphia, Secretary Tracy did that which was plainly his duty under the law. The bids of the Cramps on both vessels were very much below those of the Union Iron Works of San Francisco and on this account there was no other course for the secretary to pursue, as the two concerns are equally responsible. Everybody interested in ship building in this country would undoubtedly be highly pleased to see the contract for one of these ships sublet to the Union Iron Works. It was the serious questions involved and not a disposition unfavorable to the Pacific coast works that caused public sentiment to lean towards the lowest bidders.

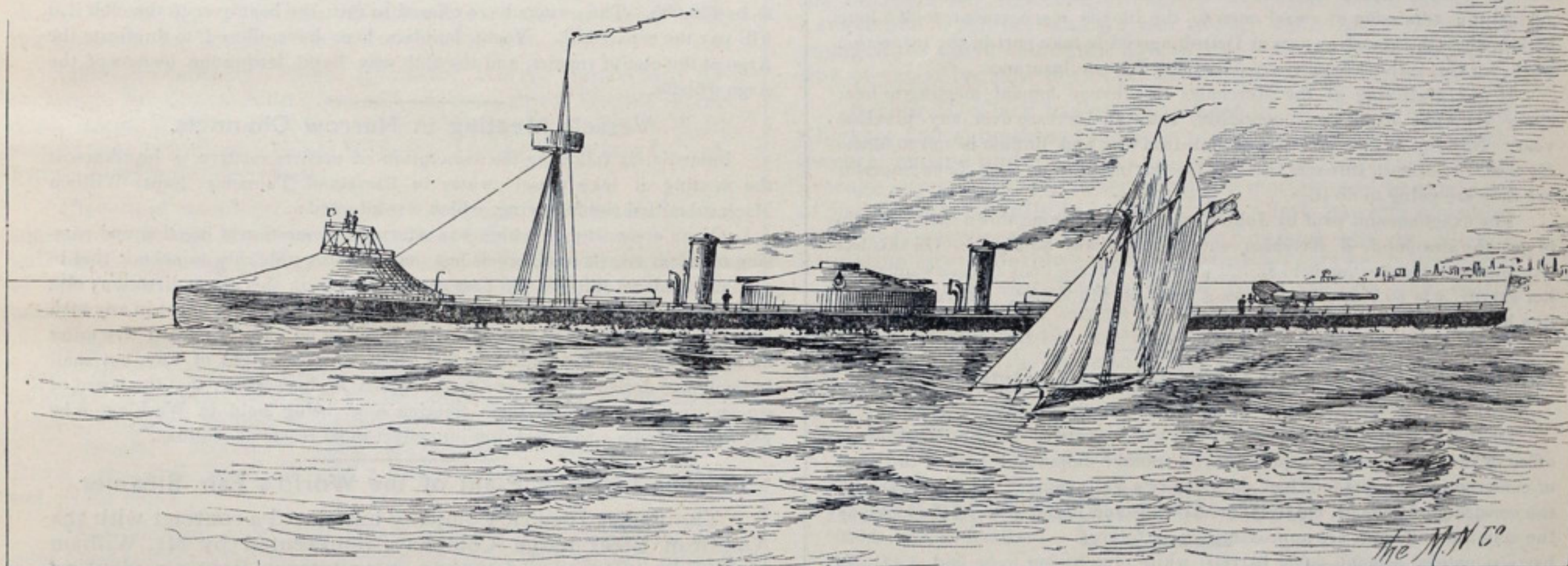
ONE of the best indications that this country will soon assert itself in the building of steel vessels is the wonderful reduction in prices during the past few years on merchant vessels as well as vessels of war. This reduction in the general cost of ships has been brought about mainly by low prices for ship building material, although it is, of course, due in part to other causes. In the building of naval vessels, where superior quality of material is required, the reduced cost is especially remarkable. Secretary Tracy reports that the prices at which the Cramps are to build the battle-ship Iowa and armored cruiser Brooklyn are 10 to 12 per cent. lower than the cost of any ship heretofore built for the new navy.

It is understood that on each pay day at the works of the American Steel Barge Company, West Superior, the pay roll is presented to the big land company operating in that place, and a check is given to Capt. McDougall for 10 per cent. of the whole amount. This seems like a very large bonus to contribute to any enterprise, but the employment of 800 to 1000 men in a single works is an important factor in the advancement of the place, and such enterprise is certainly not beyond the undertakings of either of the progressive cities at the head of the lakes.



### To Make War Vessels of the Lake Michigan Car Ferries.

While the car ferries Ann Arbor No. 1 and Ann Arbor No. 2, now in service on Lake Michigan in connection with the Toledo, Ann Arbor & Northern Michigan Railway, were being built at Toledo, Lieut. George L. Carden of the United States revenue marine inspected the boats, acting as a representative of the government, and it has since been announced that they have been declared wholly acceptable for use in case of a demand for war vessels on the lakes. A cut showing the appearance of the boats as now in use was printed in the last issue of the REVIEW. The illustration on this page, made from drawings furnished by the builders, and taken from the Illustrated Buffalo Express, represents one of the car ferries stripped of her upper works and transformed into a war vessel, according to ideas said to be held by government officials. It might be well to note in this connection, however, that no official announcement has been made by either the treasury or navy department, as to any arrangement between the government and the builders or owners of these boats regarding their construction. All talk of their adaptability to war purposes has been connected with sensational newspaper articles sent out from Washington about the three small revenue cutters recently constructed for the Canadian government.



WAR VESSEL FROM REMODELED LAKE MICHIGAN CAR FERRY.

From the Illustrated Buffalo Express. Copyrighted 1892, by GEO. E. MATTHEWS & CO., Buffalo, N. Y.

Considerable difficulty has been encountered in operating the car ferries during the extended period of severe weather since they were brought into service on Lake Michigan. Their work of ferrying loaded cars across the lake has certainly not been at a profit, although under better conditions of weather and with experience back of their management they may prove successful. It is claimed that if they do prove profitable four more of them will be built.

### To Be Paid to District Attorneys.

Previous to the time when Major L. Cooper Overman, corps of engineers, U. S. A., stationed at Cleveland, was forced to resign his position in the army on account of irregularities in his accounts, all questions regarding damages to light-houses, piers and other government property of this kind sustained through accident or negligence of vessel masters were settled between the vessel owner and the government engineer in charge of the district where the damage occurred. In order to guard against any possibility of misappropriation of such funds in the future, a clause was inserted in the river and harbor act of Sept. 19, 1890, providing that hereafter engineers must give such information to the United States district attorney for the district in which the accident occurs, and the vessel owner's settlement will be made with that officer.

### Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company.....	\$100 00	\$.....	\$ 54 00
Champion Iron Company.....	25 00	.....	35 00
Chandler Iron Company.....	25 00	.....	40 00
Jackson Iron Company.....	25 00	.....	.....
Lake Superior Iron Company.....	25 00	.....	.....
Minnesota Iron Company.....	100 00	67 00	69 00
Pittsburgh & Lake Angeline Iron Co....	25 00	.....	135 00
Republic Iron Company.....	25 00	10 00	11 00
Ashland .....	25 00	.....	.....
Section Thirty-three.....	25 00	.....	4 00
Brotherton.....	25 00	.....	.....
Iron Belt.....	25 00	.....	2 00
Aurora.....	25 00	8 00	9 00

Five members of the Merritt family, A. D. Thomson, E. H. Hall and Moses E. Clapp, constitute a new board of directors recently elected by the Biwabik, leading Mesaba range company. The very severe winter weather is delaying operations on the range to a much greater extent than was expected, steam shovel work on the strippings being almost entirely suspended. The Standard Ore Company is about to ship some of its product to the West Duluth blast furnace. A sample car load from the Hale, which was hauled to a railway station in sleighs, has been shipped to Pittsburg for test.

There is already 100,000 tons of ore in the stock piles of the

big Chandler, Vermillion range, and about 2,000 tons is being hoisted daily, which would indicate that the mine will duplicate this year its heavy output of 1892. At the new Zenith mine of the same range, which made an initial shipment of about 15,000 tons last year, the main shaft, now down 360 feet, will be sunk to a depth of 425 feet, and it is claimed that the output next year will be close to 100,000 tons.

The management of the Great Western of Crystal Falls, represented in the market by Mr. V. K. Moore of Detroit, is considering the advisability of closing down the mine. The mine shipped 87,487 tons of ore last year, but like a number of other properties it is worked at a high cost and the margin of profit has been greatly reduced through low prices that have ruled in the ore market.

Already some of Minnesota's legislators are hatching up schemes to kill the goose that laid the golden egg. Progress toward development of the new mining lands in the state have hardly begun, and it is proposed to tax the output of iron mines 5 cents a ton and of copper mines \$1 a ton.

J. B. Knight of Norway, Mich., has been appointed state commissioner of mineral statistics.

Twin screws will increase in favor as a result of the accident to the Umbria. With the general tendency to discard canvas, all ocean going steamers should have twin screws.



### Admiralty Cases at Buffalo.

Special Correspondence to the MARINE REVIEW.

BUFFALO, N. Y., Jan. 19.—A peculiar marine libel suit went to pieces here the other day. Last fall the captain of the barge Levi Rawson refused to pay the 12½ cents loading charges attached to his bill of lading and libeled the cargo for the freight. The amount in one case was only \$3 and in the other—there being two consignees—\$57. He agreed not to libel the lumber but broke his promise, and when the defense was set up that he had never demanded his freight he gave it up and paid his own costs.

It is reported that there are lumber freights on the point of being made, though none can be obtained as yet. This is a remarkably early movement and will greatly encourage carriers.

There is also a salvage case of rather unusual interest. One night last fall the canal boat Hubbell & Hill, loaded with lumber, broke loose from her moorings at Tonawanda and started for Niagara Falls. Her captain discovered that she was gone after a while and hiring two tugs gave chase. They went to within a mile or two of the falls and then tied up, sending row boats for the lost boat, which was found on the opposite side of the river, and safely taken back to Tonawanda. The tugs now want \$3,000 for services, claiming that they run great risk of being lost and that they saved the canal boat and her cargo from certain loss. The defense puts in that there was no danger to the tugs and that they did not even find the boat.

It's too bad that Buffalo must lose Capt. Daniel McLeod. Since he came down from Chicago to manage the Lloyds Register he has become deservedly popular with everybody. He has not only attended to business but personally he stands very high among vessel men. Buffalo is sorry to lose the Lloyds office, which has been held here so long, but no one complains, as the change does not appear to be aimed at us in particular, but only to centralize matters. There can be no doubt that the underwriters who have always been dead against the admission of vessel men to the Lloyds management, took a long breath when the vessel owners at Detroit agreed to take part in the inspection work, for this rather commits vessel owners to home insurance.

It was gratifying at the Merchants' Exchange annual meeting to hear every report of handling commodities show an increase over any previous year. Nothing at this port fell off but iron ore, and Buffalo is not to blame for that. If eastern furnaces can buy foreign ore cheaper than Lake Superior ore they are going to do it.

The exact amount paid by John Craig when he came down from Toledo to get the steamer J. B. Ketcham out of limbo was \$3,272.58. On this last trip she damaged her lumber \$2,750 worth in her accident at Tonawanda and her survey was \$6,954. This gives a total of \$12,926.58. There is nothing like bad luck when you once get started.

### Another St. Mary's Falls Canal Contract—Detroit Matters.

Special Correspondence to the MARINE REVIEW.

DETROIT, Mich., Jan. 19.—Gen. Poe has forwarded to the Washington office of the war department proposals on another important part of the work of constructing the 800-foot lock at St. Mary's Falls canal. The bids are for the construction of floor, culverts, breast-walls and miter sills of the lock and the material and work are approximately as follows: Portland cement, 4,000 barrels; natural cement, 6,000 barrels; white pine timber to be laid, 3,421,572 feet, broad measure; white oak timber to be laid, 15,400 feet, broad measure; iron, 1,143,272 pounds; material to be excavated, 5,000 cubic yards; concrete to be laid, 10,000 cubic yards; holes to be drilled, 67,500 linear feet. The bids were as follows:

Hughes Bros. & Bangs, Syracuse, N. Y.....	\$208,192.46
Campbell & McDonald, Duluth, Minn.....	214,211.73
Zimmerman & Traux, Duluth, Minn.....	236,294.34
Carkin, Stickney & Cram, E. Saginaw, Mich.....	336,474.34
R. J. Cram, Detroit, Mich.....	468,303.78

Hughes Bros. & Bangs, the successful bidders, are the contractors engaged on the construction of the lock, and as the specifications on this job of putting in floors, etc., provided that work prior to Nov. 16, 1893, must not interfere with the present operations, the Syracuse contractors were somewhat at an advantage over their competitors. They can arrange work on both contracts so as to reduce cost of labor as well as material.

In about two weeks the Detroit Dry Dock Company will launch the big wooden car ferry, building at the Orleans street yard, and the first of the two new Detroit & Cleveland line passenger steamers, which are to be completed in June, will go into the water shortly afterwards. The wrecked steamer Progress, which was raised from the Detroit river, is in dock and the work of repair will be pushed rapidly.

### Fast Torpedo Boats.

Special Correspondence to the MARINE REVIEW.

WASHINGTON, D. C., Jan. 19.—The naval bureaus of engineering and of construction and repair are preparing plans for four torpedo boats authorized at the last session of congress and intended for use on the battle ships Maine and Texas, which are now well under way to completion. These little crafts are to be 60 feet long, 9 feet beam and 15 tons displacement. They are to

have quadruple expansion engines, fitted with coil boilers carrying 250 pounds steam, and will also be provided with a force draught system. They are expected to develop 200-horse power and should move through the water at an 18-knot gait. Their coal capacity will be about five tons, and the consumption of coal will be 600 pounds an hour.

Representative Herbert, chairman of the committee on naval affairs, said recently that the present number of engineer officers in the navy was absolutely necessary and that any further reduction would be dangerous. If the reduction were allowed to continue the number of such officers would be but 170, and this would be totally inadequate. If the pending bill on this question were enacted into law the number would remain at 191. Mr. Holman of Indiana is opposed to the bill. The act of 1882, providing that the number of engineer officers should be reduced to 170 was, he holds, carefully considered, and nothing has occurred since that time to induce congress to change the policy then entered upon.

### Seventeen Yachts in a Single Yard.

Seventeen steam yachts under construction in the same yard at the same time is the sight that greets a visitor at the shipyard of C. P. Willard & Co. on the Chicago river. Twelve of the boats are for service at the world's fair and the remaining five will be for charter to clubs during fair season. The whole seventeen have triple expansion engines exactly alike and Roberts tubular boilers. The twelve fair boats are 50 feet long and 10½ feet wide, while the five building for charter are of the same beam but 74 feet in length. There is trouble in the aristocratic Argo club over the steam yacht Argo, brought here from Detroit last summer. The Argo was bought by a few of the club members on their individual account for some \$8,000. Some time ago the Argo went into Miller's dry dock for repairs. It was found she would have to be rebuilt. The survey placed the cost at \$7,500, but it is more likely to be \$10,000. The owners have offered to turn the boat over to the club if it will pay the repair bill. Yacht builders here have offered to duplicate the Argo at the cost of repairs, and the club may build, letting the owners of the Argo whistle.

### Vessels Meeting in Narrow Channels.

Immediately following the conclusion of matters relative to insurance at the meeting of lake vessel owners in Cleveland Thursday, Capt. William Mack submitted the following, which was adopted:

"Your committee, to which was referred the question of meeting and passing of steam vessels in channels less than 500 feet wide, beg to submit that in such channels no ship should pass another going in the same direction; that when steam vessels going in opposite directions are about to meet in any such channel, both shall be slowed down to a speed in no case to exceed five miles an hour; that the descending vessel shall have the right of way, but shall indicate her decision by proper signals given in due season; that the board of supervising inspectors at their meeting now being held in Washington be requested to pass a rule carrying into effect these recommendations."

### Electric Lighting Plant of the World's Fair Steamer.

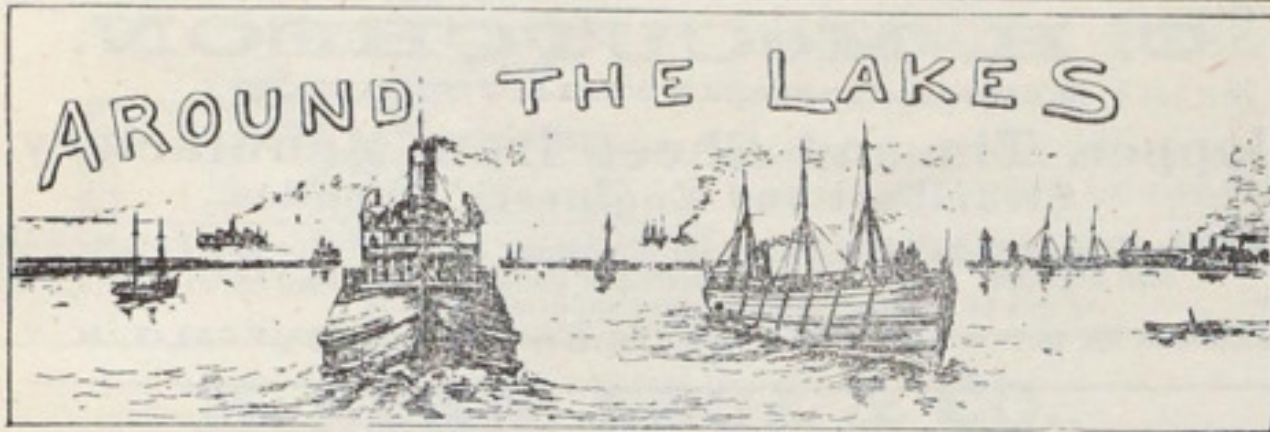
The Fisher Electric Company has closed a contract with the American Steel Barge Company, represented by Mr. William Mahon, for placing a complete incandescent lighting plant on the whaleback passenger steamer Christopher Columbus, which will carry passengers from Chicago to the world's fair. The plant will consist of about 800 incandescent lamps; and two direct-connected, twin, compound engines and dynamos, each machine of 400 lights capacity. Oxydized silver fixtures will be used throughout the boat. All the cooking will be done by electric heaters. The Fisher Electric Company's automatic alarm signal will be employed on port, starboard and masthead lights, and a powerful search light of the Mangin type will also be used. The use of compound, direct-connected engines will be rather a novelty on the lakes, and from an economical standpoint the plant will operate with a minimum amount of expense, and yet the highest degree of efficiency throughout the entire system will be attained.

The Fisher company recently removed the plant of the United States company from the steamer Tuscarora, and replaced it with the Fisher automatic dynamos and other appliances, similar to the plants in the other steamers of this fleet.

In order to make all parts of their steam pressure regulators interchangeable, as in fire arms, sewing machines, etc., the Foster Engineering Company, of Newark, N. J., has just entered a large order with the Gisholt Machine Company, of Madison, Wis., for a line of their turret lathes, with all accompanying special tools, to build the different sizes and styles of their regulators and pump governors.

Send 20 cents in stamps to the REVIEW for statement of Lake Superior ore shipments during the past thirty-seven years.





A spring flood is feared at Toledo. A sudden thaw would very probably cause some trouble.

Huron Marine Engineers Beneficial Association, No. 43, will give their tenth annual ball at Port Huron, Mich. Jan. 26.

The wrecking tug Merrick is keeping Grand Haven harbor clear this winter, and assists the Milwaukee boats when necessary.

M. E. B. A. No. 44, Manistee, Mich., will give their sixth annual reception January 20. The committee on arrangements consists of Fred Otto, A. Feldhak and F. Winkel.

Bureau of Navigation, E. C. O'Brien, commissioner, assigned number 86,206 to the tug Gunderson Bros., Milwaukee, the gross tonnage being 46.03, and the net 23.02.

Tug Schriver Brothers has been sold to V. Vanderberg of Muskegon. This will be the first fishing tug to run from that port. There are now ten tugs in the Grand Haven fishing fleet.

In another part of this issue the steamer Cormorant and consort Wall are described and advertised for sale. It is understood that the Egyptian and Winslow, two other of the remaining boats of the Winslow fleet, are also for sale.

Officers of Chicago lodge, Excelsior Marine Benevolent Association, for the ensuing year, are; Capt. James Hogan, president; Capt. William Deshler, vice president; Capt. Robert Reid, second vice president; Capt. William Turner, treasurer; Capt. Frank B. Higgle, secretary.

Cleveland members of the Marine Engineers' Beneficial Association will hold their twelfth annual ball at Army and Navy hall on the evening of Tuesday, Jan. 31. The social gatherings of this organization are always conducted in a most enjoyable manner.

The newly-elected and appointed officers of Milwaukee Lodge No 6, Excelsior Marine Benevolent Association, are as follows: President, William F. McGregor; first vice-president, John Cochrane; second vice-president, W. J. Carter; treasurer, F. C. Starke; secretary, John McSweeney; chaplain, C. M. Davis; marshal, W. E. Wright; warden, Peter Anderson; sentinel, John Doak.

With several passenger boats already in commission and new ones coming, Toledo excursion business will be well looked after next season. Parties there have secured the Hudson river steel steamer General, which is 168 feet long, 41 feet beam and 9 feet deep, and has shown a speed of 18 miles an hour. She has a license for 1,000 passengers. Mr. S. Canfield will be agent for the new company, which will compete with the Red Star line. J. B. Dewey is having a passenger steamer with capacity for 500 passengers built at Monroe, Mich., to run between that place and Toledo.

A press despatch states that a letter from Vice-President Hickey, of the Amalgamated Association of Iron Workers, to a man in West Superior, declares a systematic and extensive plan to boycott the Christopher Columbus, passenger whaleback built for the world's fair, because the vessel is built of steel plates from the West Superior Steel and Iron Company, which is a non-union shop.

Officers re-elected by the Dry Dock Association of the Lakes at its annual meeting in Cleveland are: President, Frank Wright, of Cleveland; vice president, W. E. Fitzgerald of Milwaukee; secretary and treasurer, Hamilton J. Mills of Buffalo. The rates for docking, as adopted, provide that the winter lay-day rate is to be not less than 3½ cents a ton and not more than 5 cents a ton, according to conditions which will appear upon the new card of rates when issued.

#### Personal Mention.

Capt. Darius Cole of Detroit, whose death was announced a few days ago, was in his seventy-fifth year, and had been identified with the lake marine since 1858, principally in Detroit river passenger business. At his death he owned the steamers Darius Cole, Arundel, Metropolis, and part of the Idlewild.

John G. Mullen, well known to both Canadian and American vessel masters, has been elected mayor of Amherstburg, the thriving Ontario town near the mouth of the Detroit river. Mr. Mullen, who is associated in business with the Cuddy-Mullen Coal Company of Cleveland carrying on a large fueling trade on the Detroit river, has been unusually successful since taking up a residence in Amherstburg about twenty years ago. He is now engaged, as noted some time ago, in preparations for the construction of extensive new docks on the Canadian side of the river.

Arthur H. Clark has opened offices in the Rialto building, Chicago, and announces that he is prepared to advise with vessel owners, marine underwriters and counsel, in admiralty cases, average adjustment, and other maritime matters, and to assess sea or fire damage to hulls or cargoes. Mr. Clark has had considerable experience in shipping matters in England and in Boston, his native city. During a period of twelve years he commanded steam and sailing ships in the China trade and on the North Atlantic ocean, and for eleven years represented, as chief agent for Great Britain and the continent, the Boston Marine Insurance Company, and for the same term was chief agent and surveyor in England of the Record of American and Foreign Shipping, representing these corporations at Lloyds.

INCORPORATED 1794.

### Insurance Company of North America.

**CAPITAL, Paid up in Cash, - - \$3,000,000.00**  
**ASSETS, . - - - - - 9,744,513.70**

CHARLES PLATT, President.

EUGENE L. ELLISON, 2nd Vice-President.

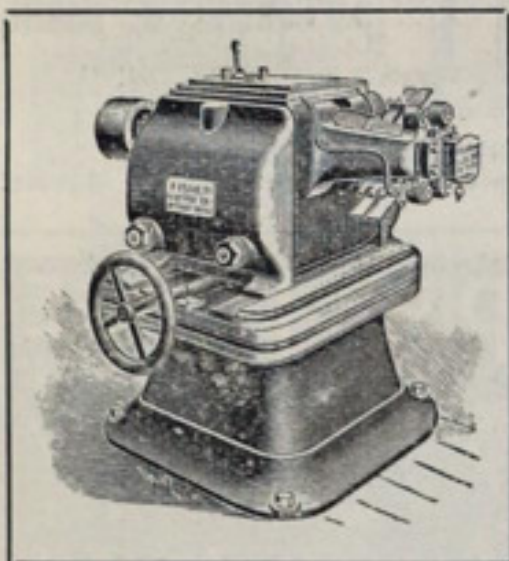
JOHN H. ATWOOD, Assistant Secretary.

WILLIAM A. PLATT, Vice-President.

GREVILLE E. FRYER, Sec'y. & Treas.

Lake Marine Department.

GEORGE L. McCURDY, Manager,  
CHICAGO, ILLS.



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**OF OUR MANUFACTURE** are endorsed by the following Owners and Managers of some of the **Finest Steam Vessels on the Lakes:**

**IF YOU WANT** your Steamer equipped with an . . . . .

### AUTOMATIC INCANDESCENT LIGHTING PLANT,

Which can be handled by an engineer without any previous knowledge of electric plants, and which will operate arc and incandescent lamps from the same dynamo, write the

**Fisher Electric Company,**

**Detroit, Mich.**



## MARINE REVIEW LINER EXCHANGE.

Space under this heading may be used gratis by our advertisers or subscribers to call attention to vessels or any craft, machinery, new or second hand, that they may have for sale. Those wanting machinery of any kind or wishing to purchase vessels, are invited to take advantage of the same offer. Employers in need of professional men or men who want positions may avail themselves of the opportunities offered. Each item will be limited to three lines. Letters concerning same must mention number attached to item and be addressed MARINE REVIEW, 516 Perry-Payne Building, Cleveland, O.

160—WANTED—A second-hand tug engine, compound preferred; size to equal about 24 by 24.

161—FOR SALE—Second hand marine boiler, 8 feet face and 13 feet long, with steam chimney about seven years old, but has been used only a short time and is in good order; built at Washington navy yard and has composition tubes; plates of Otis steel, double riveted nearly all over on external seams; will inspect for 95 pounds.

162—FOR SALE CHEAP—Steam launch, 25 feet long, 5½ feet beam. Porcupine boiler and oil for fuel. In very good condition. Boat cost \$750; nearly new; will sell for \$300.

163—WANTED—Twenty engineers and pilots to run launches at the world's fair.

164—WANTED—Five first-class tug engineers.

165—WANTED—To buy or lease, passenger steamer, about 100 feet long, suitable for coasting trade on Lake Superior.

166—FOR SALE—Twin screw steel hull steamer, 120 feet long and 18 feet wide; draft, 4½ feet; speed, 18 miles.

167—FOR SALE—Steamer Rust and Schooner Barnes, having 6-cent wheat on board.

## THE JENKS SHIP BUILDING CO.

Will have FOR SALE OR CHARTER by the beginning of navigation, 1893,

## THREE (3) STEAMERS

Especially Designed for the Lumber Trade.

If interested, address them at PORT HURON, MICH.

**"THE KRIEBEL" STEAM ENGINES.**



STATIONARY MARINE & HOISTING  
ENGINES WITH VERTICAL OR HORIZONTAL  
STEEL BOILERS. SEND FOR CATALOGUE  
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**CHEAP BOOKS.**  
Key to Engineering.....\$0 25  
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Kedge Anchor, bound in cloth 2 50  
Roper's Hand-Book of Marine  
Engines ..... 3 00  
If you want any of these books  
enclose money and address to  
MARINE REVIEW, 516 Perry-Payne  
Bldg., CLEVELAND, O.

## FOR SALE.

**Steamer David W. Rust,** laid up at Duluth with 33,800 bushels of wheat on board, drawing 13 feet 7 inches of water; freight and storage to Buffalo 6 cents.

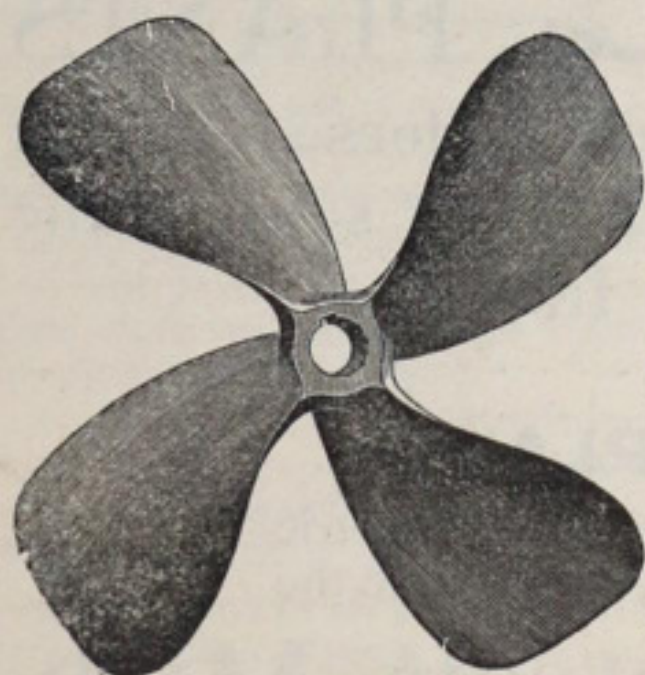
**Schooner C. C. Barnes,** also laid up at Duluth with 33,300 bushels of wheat on board, drawing 13 feet 7 inches of water; freight and storage to Buffalo 6 cents.

For further particulars, apply to

2-8

**SULLIVAN & HUBBARD, TOLEDO, OHIO.**

## H. G. TROUT, KING IRON WORKS, BUFFALO, N. Y.,



MANUFACTURERS OF  
**TRIPLE EXPANSION,  
THREE CYLINDER,  
FORE AND AFT  
And STEEPLE COMPOUND  
MARINE ENGINES,  
High and Low Pressure Engines,  
Sectional, Propeller.  
Tug and Yacht Wheels.  
Cowles Aluminum and Manganese  
Bronze Propeller Wheels.**

These Wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

## C. H. McCUTCHEON,

(Successor to SAMUEL McCUTCHEON.)

Copper, Tin and Sheet Iron Manufactory,  
Steamboat and Engineers' Supplies.

All kinds of Brass Cocks, Globe Valves and Couplings, &c. Iron Pipe and Fittings, and Mill Supplies. Rubber Belting, Hose and Packings, Springs, Valves, &c., Leather Belting and Usudurian Packing.

Telephone No. 68.

No. 18 Ohio Street BUFFALO, N. Y.

## WANTED.

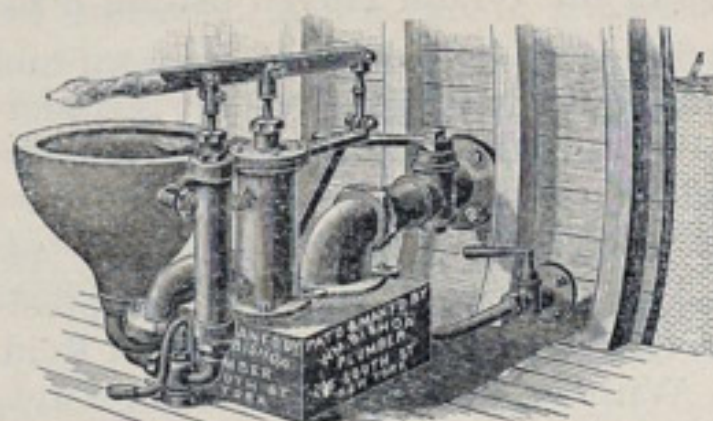
## TUG ENGINEERS.

We want Five First-Class Engineers for the coming season. None need apply but those who wish to stay all season, and can give satisfactory recommendations from former employers.

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## COMBINATION PUMP WATER CLOSET



For Yachts, Pilot Boats,  
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For above or below water line. No tank needed, and when below water line you can flush bowl without having to use pump.

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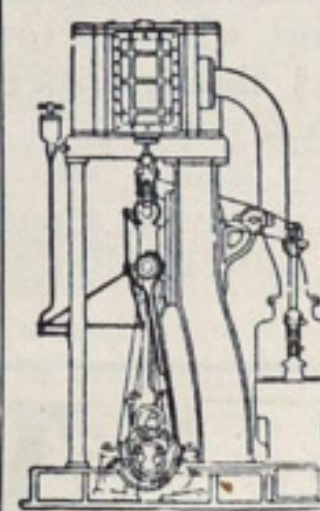
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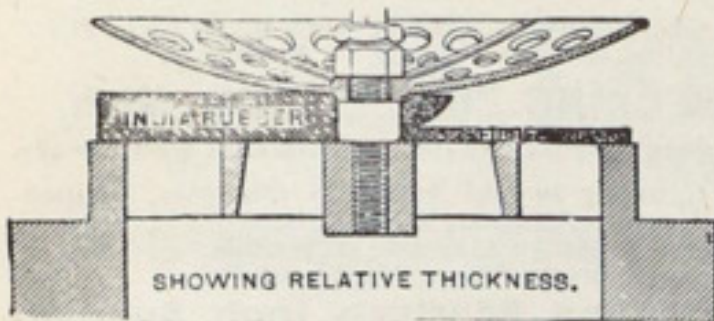
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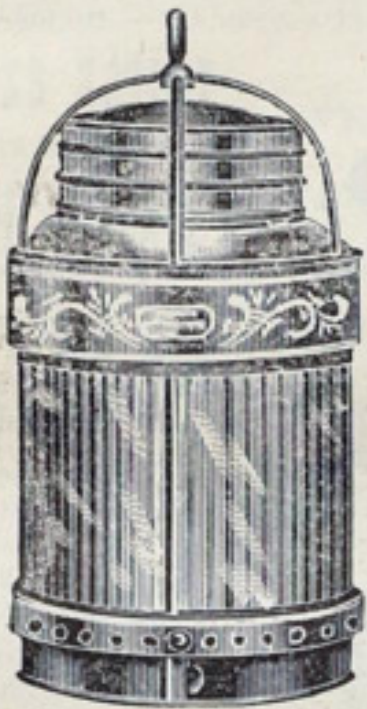


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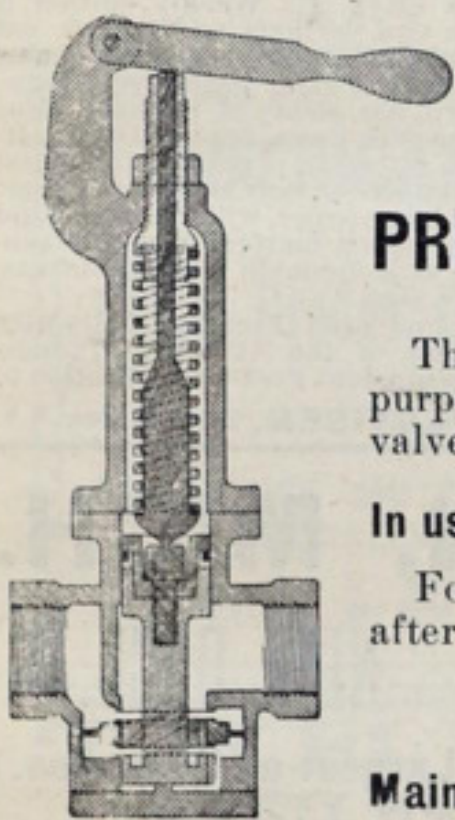
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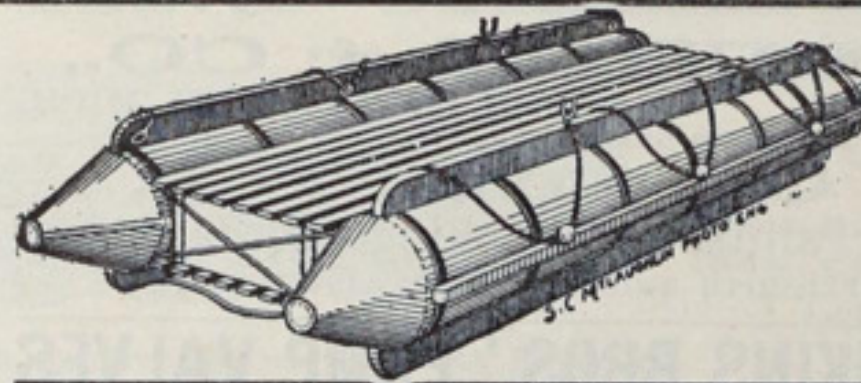
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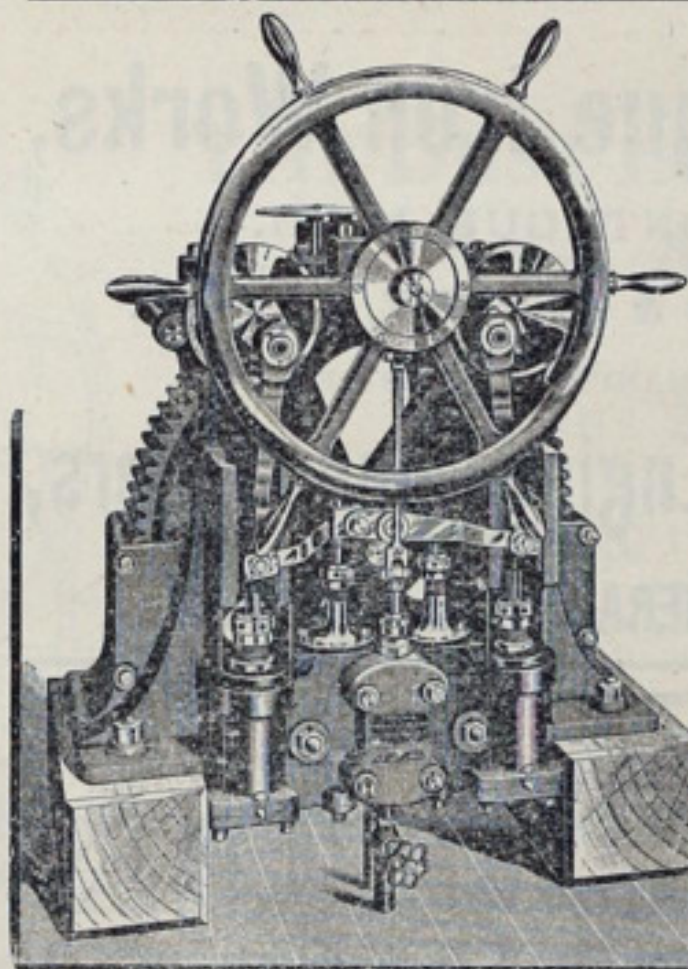


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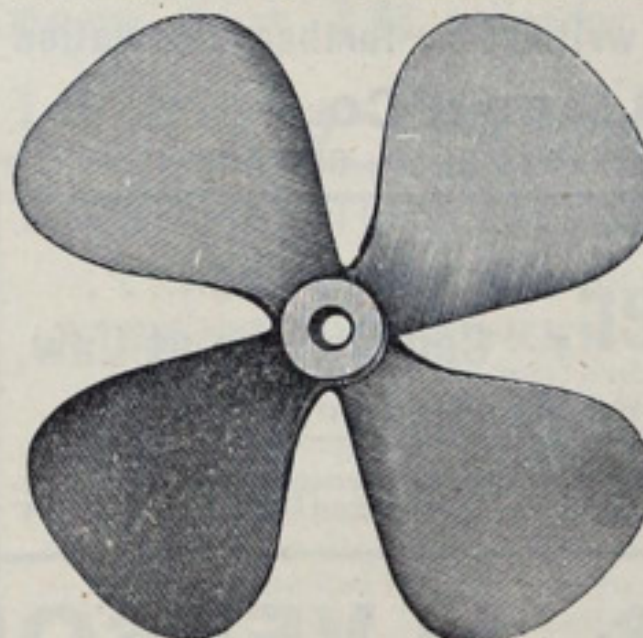
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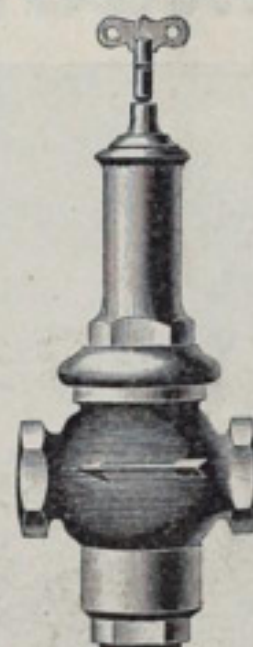
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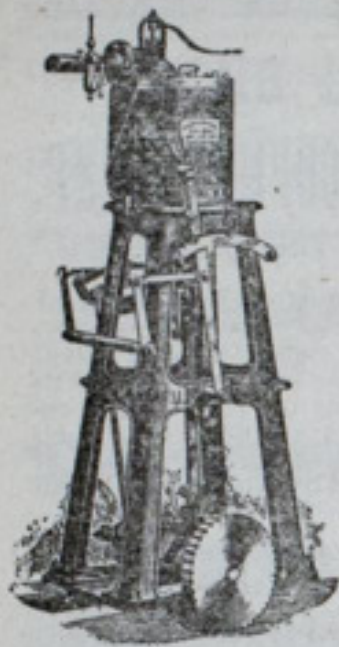
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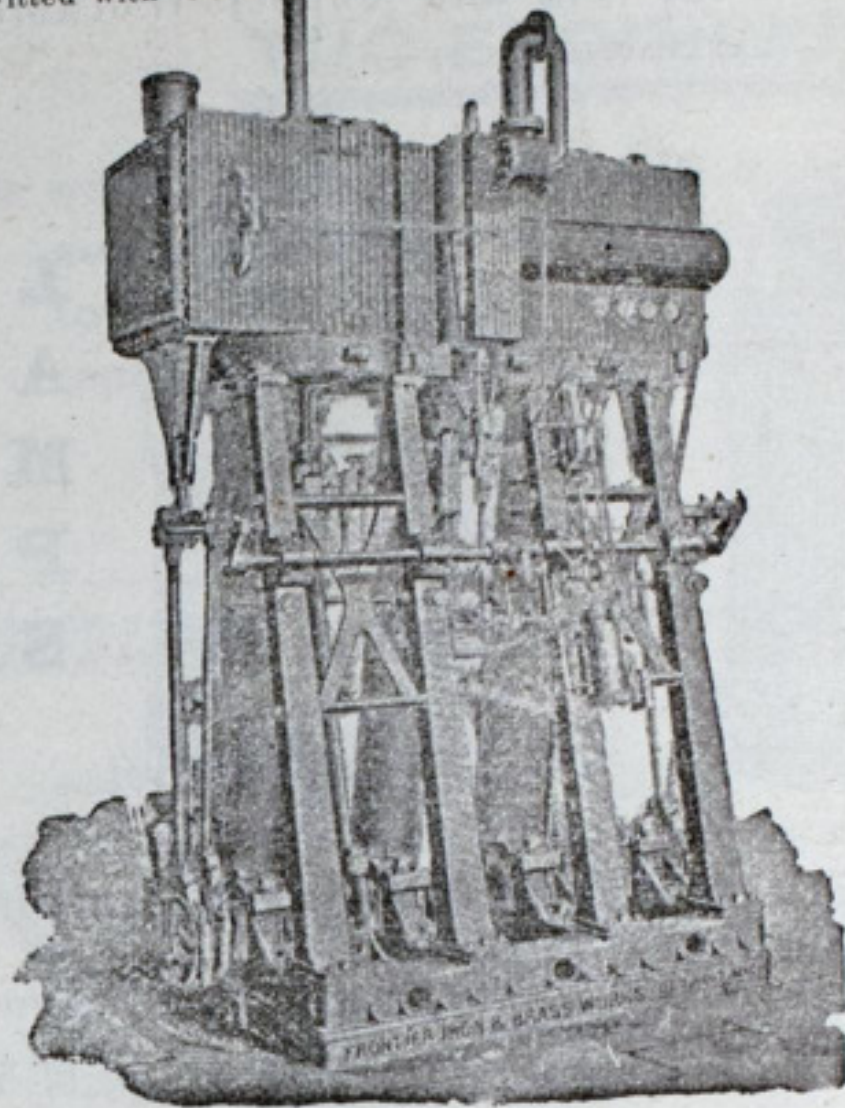
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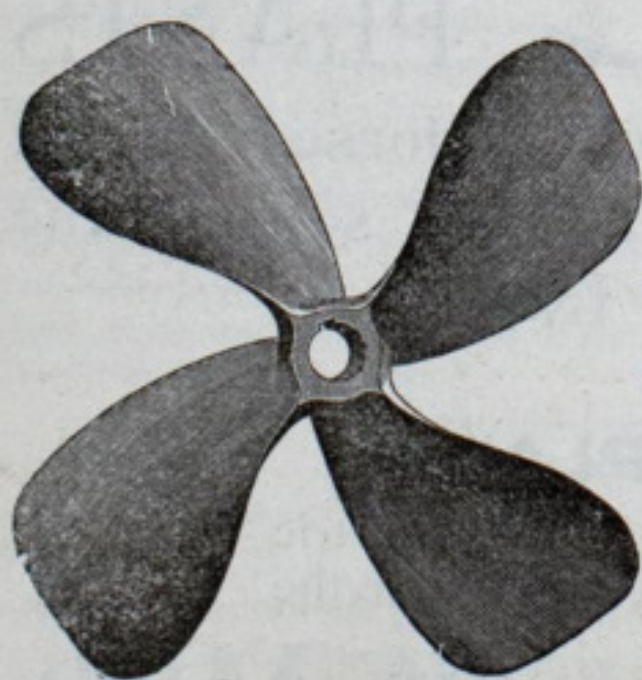
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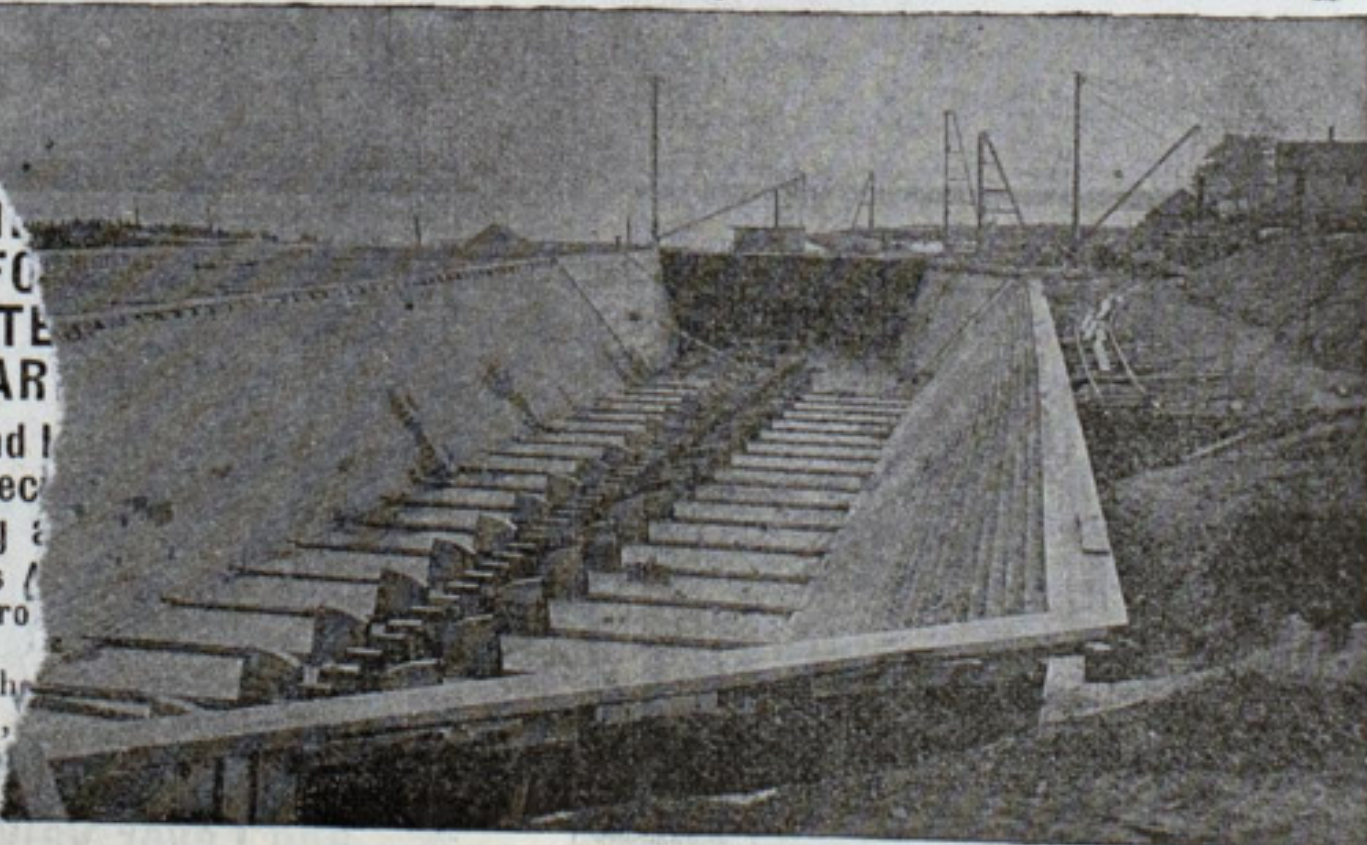
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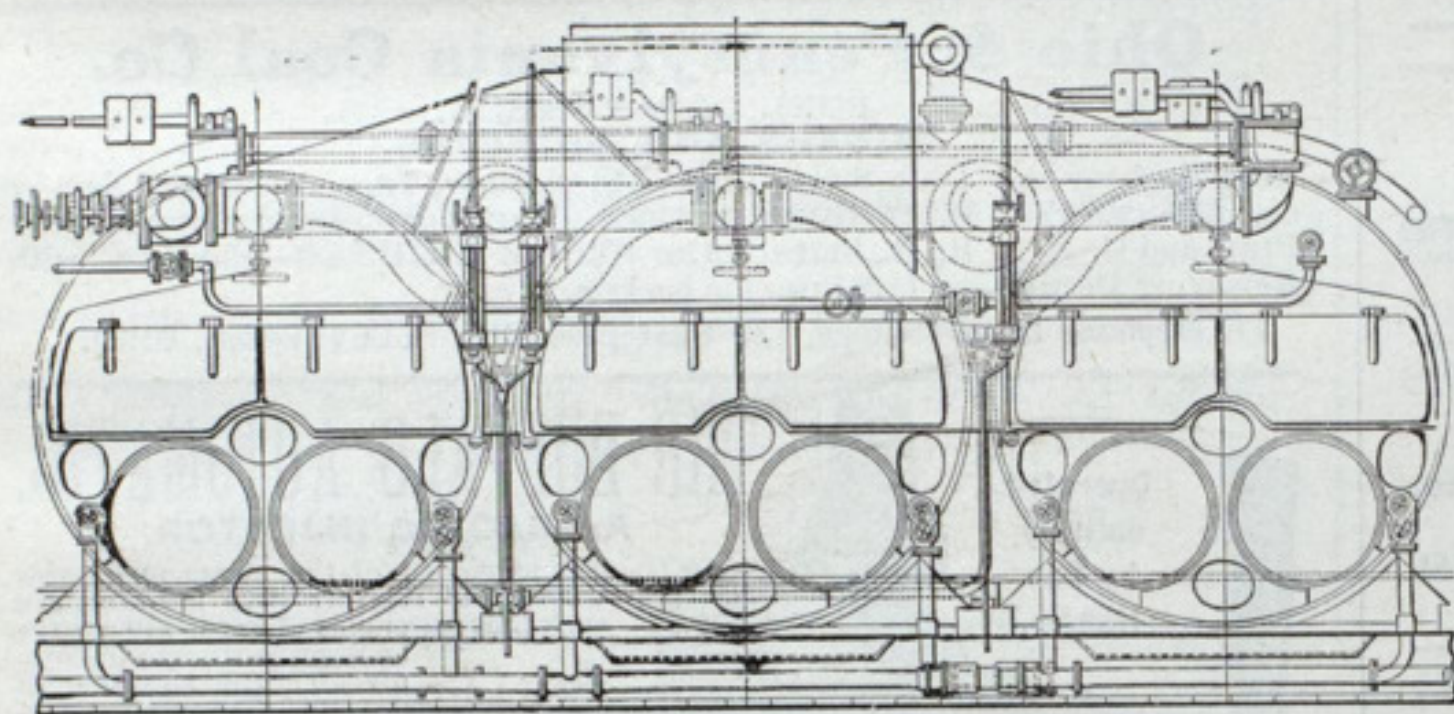
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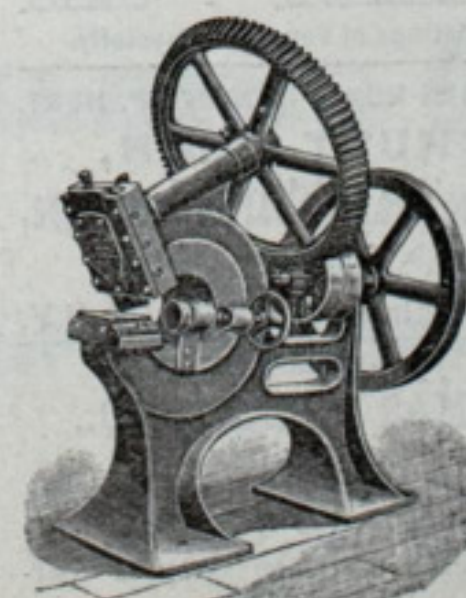
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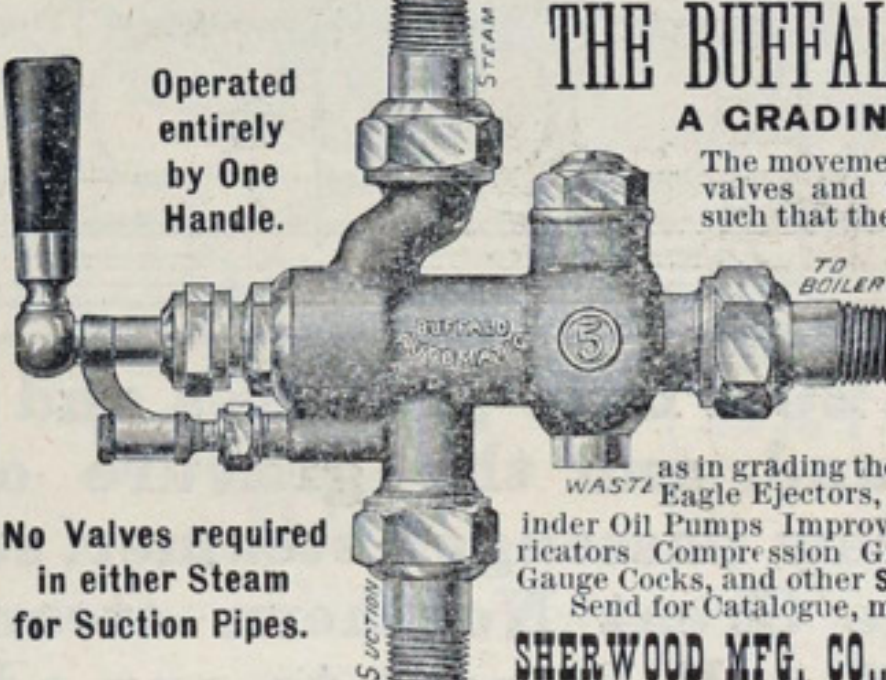
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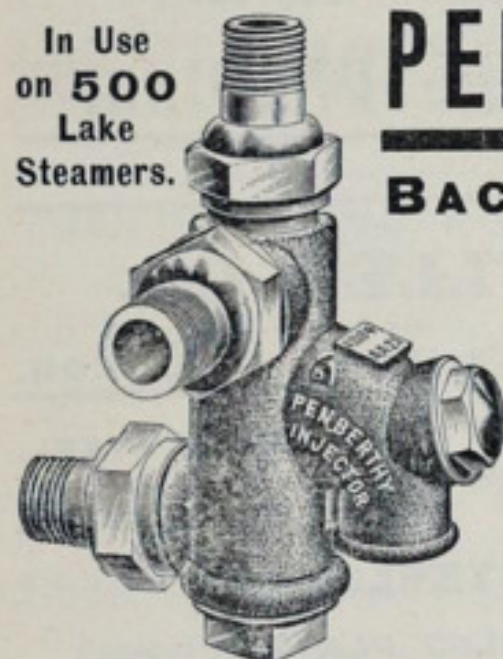
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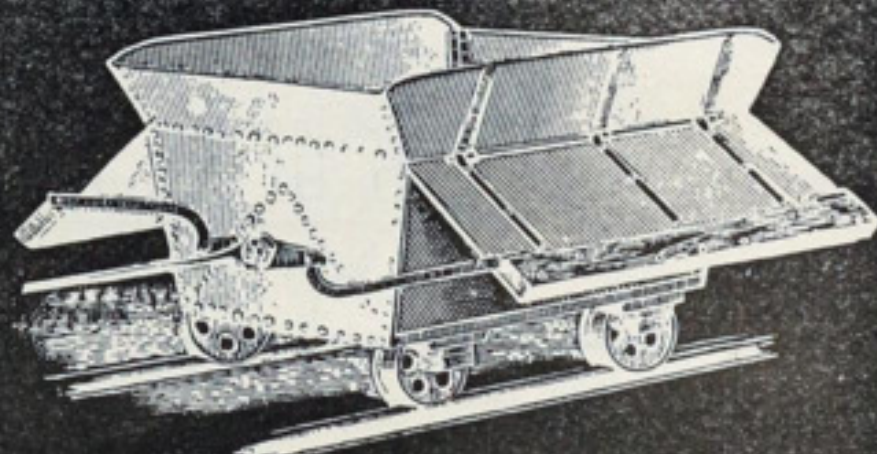
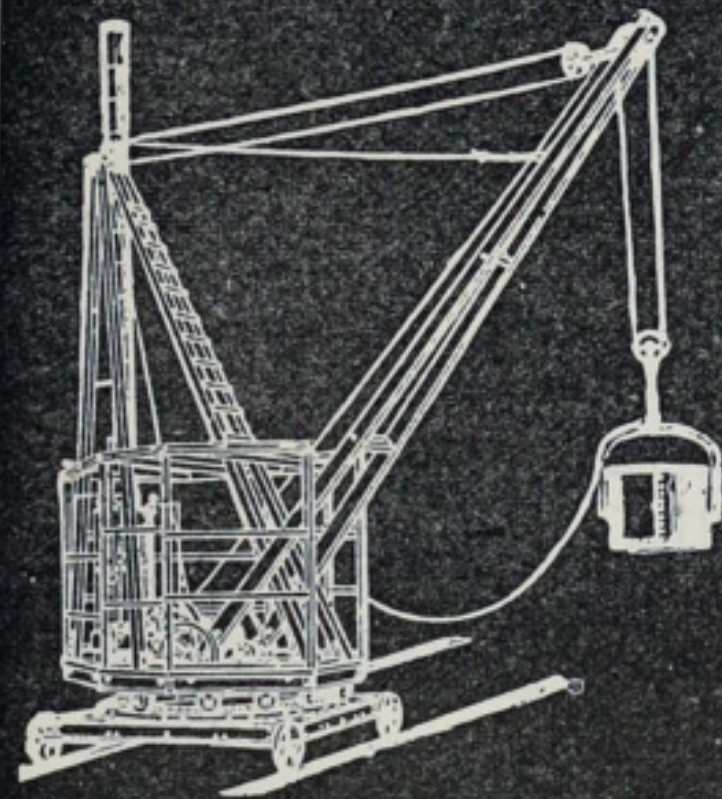
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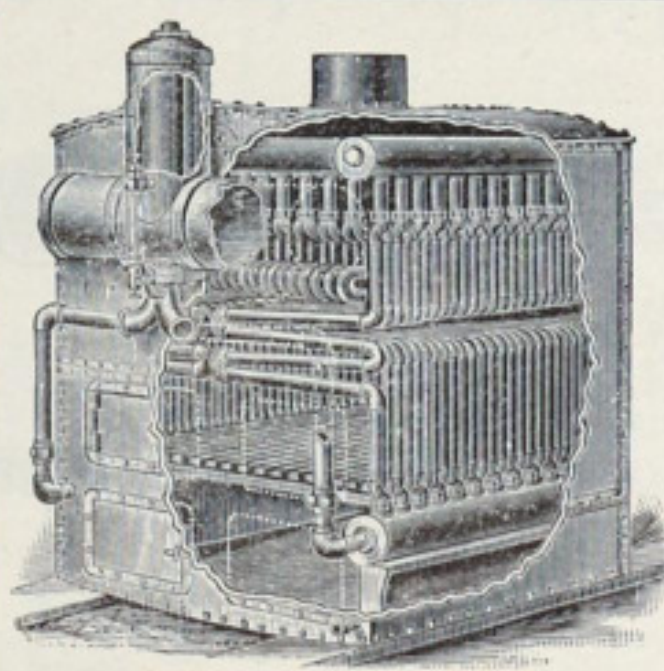
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